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ABSTRACT

The purpose of the present study was to determine: (1) How much the development of a student's attitude toward life was affected by different aspects of his achievement and family background; and (2) How the part played by these factors compared with that played by different aspects of the school he attended. We constructed an index that reflected the student's attitude toward life. A High score on this index demoted in the importance of hard work rather than luck as an ingredient in success, and in the availability of education as a means to a better life. It also measured the student's belief that people like himself had a chance to get ahead without sacrificing their personal identity or integrity. The principal finding was that the highest scores on this index were obtained by students who were white. Next highest were Oriental-American students, followed by Negroes, Indians, and Mexican-Americans in a tie for third place. Puerto Ricans last. In studying differences among individual students, we found that the family background, achievement, and school factors played a greater role in the attitude toward life of minority group students than in that of white students. The student body's attitude toward life was more important than any school characteristic. (Author)

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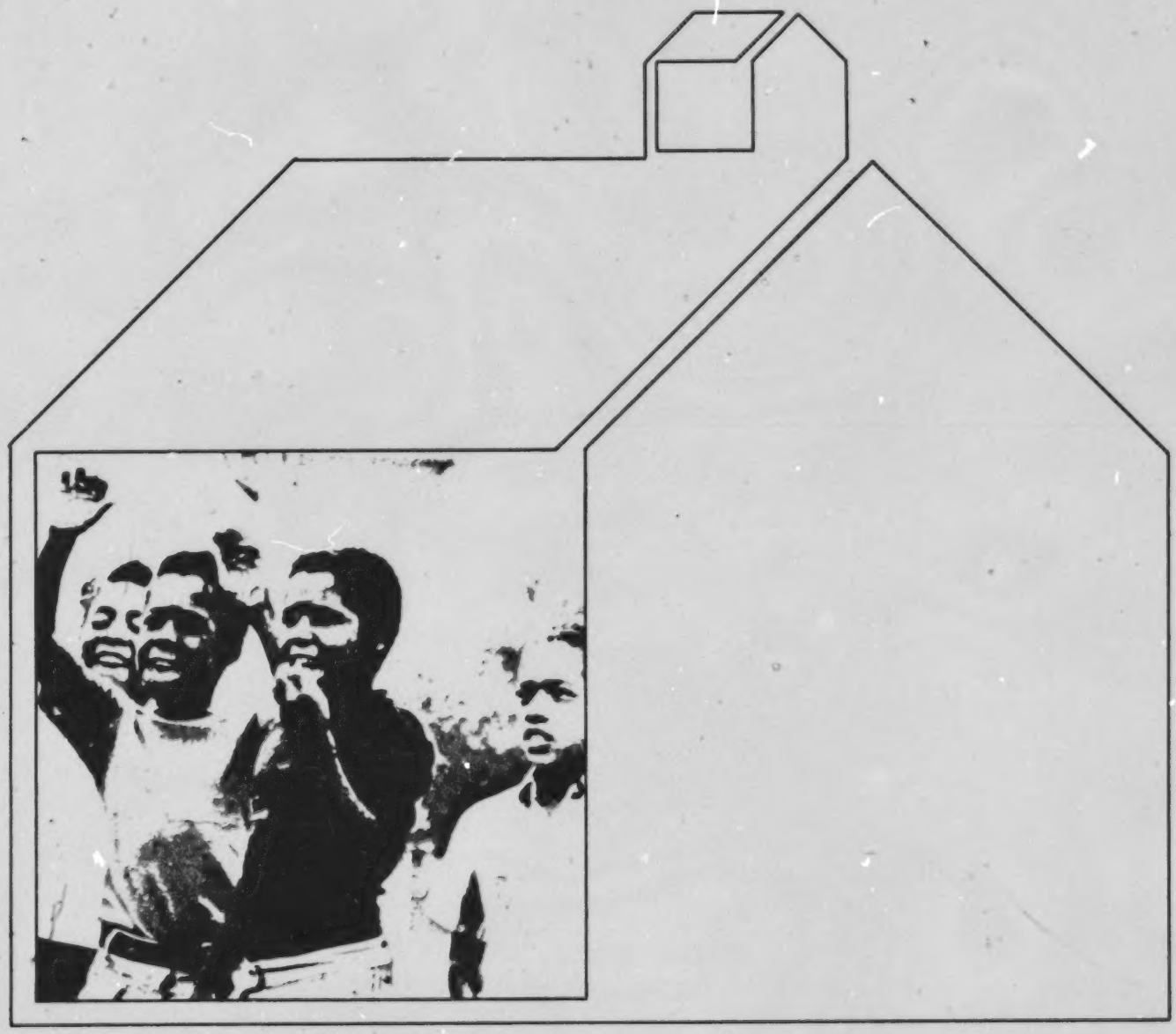
A STUDY OF THE ATTITUDE TOWARD LIFE OF OUR NATION'S STUDENTS

by
George W. Mayeske
Tetsuo Okada Albert E. Beaton, Jr.
With a Foreword by Alexander M. Mood



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Foreword

The present volume is the fourth major analysis of the voluminous information gathered in the survey of educational opportunity that the U.S. Office of Education carried out in the fall of 1965. The first major analysis was, of course, the famous Coleman Report,[1] made under the direction of Prof. James S. Coleman of Johns Hopkins University. The other three, however, might well be called the Mayeske Reports, since they were all produced by teams headed by Dr. George W. Mayeske of the U.S. Office of Education. These three reports have viewed the survey information far more deeply and expertly than was possible in the limited time available to prepare the original report. Together they represent a giant step forward in understanding some of the most fundamental aspects of education in our public schools.

The first three studies focused on academic achievement as the criterion of analysis. The Coleman Report examined a host of school, family, and student factors as they contributed to student achievement. The first Mayeske Report looked more deeply into school factors as they related to student achievement, while the second explored family and individual factors in the same connection. The present report, on the other hand, uses student attitudes instead of achievement as the criterion, and investigates the relation of various school, family, and student factors to attitudes. We are indebted to Prof. Coleman for insisting that the survey cover student attitudes not only as input variables to the educational process but as criteria. In my preliminary design of the survey, I had contemplated that academic achievement would be the only criterion used for evaluating various educational practices and policies. Prof. Coleman made it clear that there are other very important outcomes, both of education and of the other cultural forces acting upon the child. One of these is the child's own view of his abilities, and the extent to which he believes he can use these abilities to accomplish whatever he wishes to accomplish. Such attitudes are very important to self-motivation in school and they are obviously to some degree a product of the schooling process. Just as obviously, however, they are also very dependent on various home, community, and social processes. In any case, it can scarcely be denied that a positive self-image is helpful to success in education or any other endeavor. It follows that those children who, for one reason or another, have not developed a sufficiently positive self-image in their homes and neighborhoods must depend on schools to help them develop one.

The findings of this study of attitudes are thoroughly summarized in the last section of each chapter and in chapter 7 (p. 75), so that there is no need for me to touch on them here. I should say, however, that I am convinced they are of tremendous importance for educational policy and for school practice; that they also have much to say to parents; and that I hope they will be widely disseminated and discussed so that their great potential for improving public education will have a fair chance to be realized.

I will take the opportunity offered by this foreword to comment on some criticisms that have been made of a method of analysis extensively used in all these reports. I refer to their dependence on partitioning variance, or multiple R^2, rather than on regression coefficients. I am probably more responsible than anyone else for the use of this method here; certainly, I strongly urged Prof. Coleman when we were doing the original analysis that we rely mainly on it. The fundamental criticism has been well presented by Glenn Cain and Harold Watts.[2] But perhaps we can get to the heart of the matter most quickly by considering an unsettling example that I received in a private communication from Prof. Arthur Goldberger, a distinguished econometrician at the University of Wisconsin. Consider an industry in which the more educated employees move about regularly from firm to firm but less educated ones tend to stay with one firm. Let x_1 be an employee's years of education; let x_2 be his years of service with his present employer; and let y be his annual income. Let us further suppose that these variables, after some unitizing transformation, are related by the equation

$$y = x_1 + x_2 + u$$

where u is a random disturbance with zero mean and unit variance; y, x_1, and x_2 have zero means and unit variances; and it is expected that

$$E(x_1 x_2) = -0.5$$

and that

$$E(x_1 u) = E(x_2 u) = 0$$

that is, u is uncorrelated with x_1 and x_2. Under these assumptions we find the following variance-covariance matrix

	x_1	x_2	y
x_1	1.0	−.5	.5
x_2		1.0	.5
y			2.0

The squared multiple correlation of y on x_1 and x_2 turns out to be 0.5, while the squared correlation of y on either x_1 or x_2 turns out to be 0.125. Hence, the unique portion associated with either x is 0.375 and the common portion to be associated jointly with x_1 and x_2 is

$$0.5 - 0.375 - 0.375 = -0.250$$

a large negative number to which it is really not possible to give a reasonable interpretation.

Because such a bizarre thing can happen, a great many people rightfully distrust the partition procedure and much prefer to judge the importance of independent variables by their regression coefficients. However we may note with respect to this example that it is somewhat loaded by the use of x_2 as the number of years of experience with the firm rather than as total years of experience. A sounder model would incorporate total years of experience, in which case x_1 and x_2 would be positively correlated and the partition of R^2 would make a lot more sense.

An extended reply to Cain and Watts was made by Coleman.[3] He pointed out that there do not as yet exist any accepted underlying models for connecting variables in the field of education.

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[1] 1970, "Problems in making policy inferences from the Coleman Report," *American Sociological Review*, 35, pp. 228-242.

[2] James S. Coleman, 1970, "Reply to Cain and Watts," *American Sociological Review*, 35, pp. 242-249.

In fact, the situation in educational research is altogether different from that in economic research, where the critics of our methodology are nearly all to be found. When it comes to quantitative models, education, at least in comparison with economics, is still in the Stone Age: true theoretical models are still lacking, as are reproducible conceptual connections that might give us a few clues on constructing even a simple model. The main reason is of course that education is vastly more complicated than economics; also, educational researchers have not been trying to develop theoretical models for nearly as long.

Let me try to explain why we cannot even use simple linear regression models in education with any assurance that a regression coefficient might be reproducible. For instance, the amount of arithmetic a child learns in school might reasonably be supposed to depend on the quality of his arithmetic teacher together with such factors as his prior knowledge, his general motivation, his aptitude for mathematics, the amount and quality of personal tutoring in arithmetic he gets from his parents, the extent to which his and the teacher's personalities are in accord or discord, and his ability to compete with other students for the teacher's attention. But let us put aside all these other things that should probably enter the model and think about this one variable: quality of teacher. How shall we measure it? Nobody has thought of a simple way; a teacher is a very complex entity and there seem to be a great many dimensions that must be taken into account in specifying a good one. Some of them, we can safely say, are good understanding of arithmetic, good ability to diagnose a child's fundamental difficulty on the basis of fragmentary information, ability to communicate clearly in terms the child can understand, ability to perceive that a child is not fully grasping a communication, good judgment about allocating time to individual students for individual assistance, good judgment about selecting and emphasizing things to be learned, good knowledge of techniques for clarifying and exemplifying arithmetical operations, and ability to make arithmetic interesting and important to children. Nor is this an exhaustive list. Is it any wonder that economics is so simple relative to education? Economists have no great difficulty about measuring value; it is just the market price or, in the case of a person, the person's salary. This measure of a teacher is worthless because teachers are not paid according to the quality of their teaching. But even if they were, salary would be of minor utility as a measure because it is obviously ridiculous to conceive, in a comprehensive theory of education, that such a complex phenomenon as a teacher could be described by a scalar quantity.

Thus, in order to get a measure of teacher quality, one must somehow encompass a great many dimensions. Few of these are easy to measure; in fact, there is little hope of directly measuring some of them, and one must resort to various proxy measures that one hopes will be highly correlated with the measures he would much prefer to have. He can, of course, test these proxies over a period of years and eventually develop some confidence that they are effective surrogates. This stage has not yet been reached, but we are working on numerous measures and developing some sort of feel and intuition about some of them. For example, as a result of the Coleman Report we are pretty sure that direct surrogates for teacher competencies, such as score on a verbal ability test, are far better indicators than the conventional surrogates used by educational administrators: advanced degrees, years of experience, graduate training, conscientious adherence to regulations, community service, maintenance of discipline, and so on.

Stumbling through this theoretical no man's land, one must depend heavily on his intuition about the essential dimensions of the variable he is trying to measure. He must call on his intuition again to dream up for each dimension a set of proxies that might or might not be correlated with an ideal measure for the dimension. Hence his analysis must be based on a collection of sets of measures of proxies. He would be crazy to suppose those measures are his fundamental variables and to go about calculating regression coefficients. There are too many of them, anyway, so that all the regression coefficients would be very small.

The point is that he has, for example, a large collection of measures vaguely related to teacher quality. He knows teacher quality is an important variable in arithmetic achievement. How shall he assess teacher importance on the basis of this pitifully inadequate collection of sets of measures? It seems to me that about all he can do at the moment is trust his intuition by assuming that his collection of measures is, as a group, a reasonable surrogate for teacher quality, and then calculate how much the group reduces the variance of children's arithmetic achievement scores. He can do a little better than that, as Dr. Mayeske has done, by using a factor analysis to determine weights for the items in the collection, and then calculating how much the weighted items reduce the variance of children's scores. The weights also have the value of sharpening one's intuition with regard to selecting effective proxies the next time around.

By this slow process we shall eventually develop some believable theory. As we proceed along that path we shall abandon partitions of variance as soon as possible and move to calculation of regression coefficients and path coefficients. Still later we shall arrive at that glorious day when we can write down a set of simultaneous structural equations and believe that the structure is correct. That day is a long way off but already we can point to a tentative stab or two in its direction.[4] They at least prove that we would love to have some sound theory and are terribly anxious to get there.

The studies of student attitudes in the present volume will give our intuitions an enormous boost as we struggle with the nature of student motivation and its place in theoretical models and the roles of parents (in some side structural equation) in developing student motivation.

Alexander M. Mood

University of California at Irvine

[4] See, for instance: Henry Levin, 1970, "A New Model of School Effectiveness," in *Do Teachers Make a Difference?* (Washington, D.C.: U.S. Government Printing Office); and Stephan Michelson, "Association of Teacher Resourceness With Children's Characteristics," in the same volume.

Preface

The stimulus for this report grew out of the second monograph in this series, "A Study of the Achievement of Our Nation's Students," which showed that a student's belief about his ability to influence his life through the avenue of education played an important role in explaining his academic achievement, and that this was especially so for minority group students. Accordingly we decided to explore this variable "attitude toward life" in much greater detail by performing many analyses similar to the ones in the earlier monograph. This report also resembles its earlier companions inasmuch as its purpose is to summarize and display structural properties of the data, and to show how these structural properties permit various interpretations to be made. In the present case, these interpretations pertain to the possible effects of family background, achievement, and school factors on a student's outlook on life. However, the findings of this study should be regarded more as hypotheses than as firm conclusions. We proffer them for further research through longitudinal and experimental studies. A thorough integration of these findings with the existing literature would be exceedingly difficult and beyond the scope of this report. Such a synthesis would be difficult for two reasons. First, our index of a student's outlook on life incorporates not only control of destiny but self-concept. These two aspects have seldom been included together as a single variable for analytic purposes. Second, as noted by P. A. Zirkel (1971), the literature on self-concept does not readily lend itself to a synthesis because of the widely varying definitions used by different investigators.

This report is intended for use by educational researchers who are engaged in studying family background and school influences. We included some highlights in chapter 1 that we felt might be of particular interest to those who are not researchers; the same findings are presented in greater detail in chapter 7. The remaining chapters are intended to provide technical support for these conclusions, while the technical supplement contains the supporting data with an exposition of some of the techniques used in the individual chapters.[1]

There are three other reports in preparation that utilize this same data base (i.e., the Equal Educational Opportunity Survey data). One of these contains a variety of special-purpose studies of student achievement. Another focuses on the teachers, while the third presents the results of a new model that allows one to hypothesize and test for the "interactive effects" of different sets of variables over time.

Like our earlier reports, this one represents the culmination of a team effort in which each of the authors contributed according to his specialized interests and background. Without the extraordinary talents in statistical calculus of Albert E. Beaton, Jr., we would not have been able to organize this massive volume of data in a manner that would permit us to make complex analyses in a simple and economical manner. The developmental work on the commonality model was performed by Carl E. Wisler after an initial assist from Alexander M. Mood. It was later generalized to the case of multivariate dependent variables by Albert Beaton, who also developed the criterion scaling technique. Tetsuo Okada conducted the data processing and analytic work and provided many thoughtful comments on earlier versions of the manuscript. Kathryn Crossley prepared the extensive and attractive tabular work. This work also profited from the early efforts of Frederic D. Weinfeld, Kenneth A. Tabler, Wallace M. Cohen, John M. Proshek, David S. Stoller, and Harry Piccariello. The senior author is solely responsible for the techniques used, the content of the study, and its presentation.

The labors of this team could not have reached fruition without the initial impetus given to the work by Alexander M. Mood when he was Assistant Commissioner for Educational Statistics, and the later support of the work by Joseph N. Froomkin and John W. Evans when the staff was transferred under the authority of the Assistant Commissioner for Program Planning and Evaluation. To them this work is most heavily indebted. It has also benefited greatly from the thoughtful review and constructive comments of Alexander M. Mood and from the abiding interest of Daniel P. Moynihan. The organization and style of this report were improved through the editorial efforts of John M. B. Edwards. Priscilla Dever Wolf helped fulfill many of the administrative requirements associated with an undertaking of this nature. Shirley Stevens has worked with sustained effort for the past year typing the manuscript. At times she received assistance from Rhonda Lewis. After the report had been edited for publication it was entirely retyped by Elizabeth J. Ritter.

The authors are also grateful for the abiding interest of their colleagues and for their efforts to isolate us from many administrative tasks. Without the efforts of all these people this report would not have been possible.

George W. Mayeske

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[1] The technical supplement is available under separate cover upon request from the senior author at the U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

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Abstract

The Coleman Report had shown that attitudes such as a sense of control over one's environment were highly related to a student's achievement but not to many characteristics of the school he attended. The correlates of achievement were further examined in a study that used the same data base (Mayeske et al., 1972b, hereafter referred to as the Achievement Study). This study found that the motivational aspects of family life, including parent-student interaction in support of educational aspirations, played a greater role in the student's achievement than either his family's socioeconomic status or its structure and stability (e.g., whether or not the father was present).

The purpose of the present study was to determine: (1) How much the development of a student's attitude toward life was affected by different aspects of his achievement and family background; and (2) How the part played by these factors compared with that played by different aspects of the school he attended.

It has already been established by the Achievement Study that students from minority groups were far less likely than other children to feel that they had a chance to be successful in life. In order to explore this and other such relationships more closely, we constructed an index that reflected the student's attitude toward life. A high score on this index denoted belief in the importance of hard work rather than luck as an ingredient in success, and in the availability of education as a means to a better life. It also measured the student's belief that people like himself had a chance to get ahead without sacrificing their personal identity or integrity. The principal finding was that the highest scores on this index were obtained by students who were white. Next highest were Oriental-American students, followed by Negroes, Indians, and Mexican-Americans in a tie for third place. Puerto Rican students scored lowest of all. Girls of all racial-ethnic groups had consistently higher scores than boys, though not by much. However, there were considerable regional variations within racial-ethnic groups.

In studying differences among individual students, we found that family background, achievement, and school factors played a greater role in the attitude toward life of minority group students than in that of white students. Of the family background factors, family structure and stability turned out to have the least important explanatory role, and family process, especially reading to a child at the preschool stage and discussing his schoolwork with him after he had started school, the most important. The effect of the type of school attended could not be distinguished from the effects of family background and achievement. Moreover, the student body's attitude toward life was far more important than any other school characteristic.

We concluded that the minority group students' less optimistic outlook on life was an accurate reflection of social reality, and would not be changed until discrimination in employment, housing, and schooling was eliminated. We also concluded that much could be done to eliminate the random element in child rearing, since most parents have little awareness of how they are affecting their children's intellectual and emotional well-being, and that the dependence of a student's performance upon his fellow students' level of achievement could be lessened by changing the schools' reward and performance criteria. Finally, it seemed to us that the phenomenon of discrimination by educators against students who spoke nonstandard English was one that deserved more attention than it had so far received.

1. Introduction[1]

1.1. THE EQUALITY OF EDUCATIONAL OPPORTUNITY SURVEY

Title IV of the Civil Rights Act of 1964 required the Commissioner of Education to—

> . . . conduct a survey and make a report to the President and the Congress, within two years of the enactment of this title, concerning the lack of availability of equal opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions at all levels in the United States, its territories and possessions, and the District of Columbia.

In response to this request the Equality of Educational Opportunity Survey was carried out by the National Center for Educational Statistics (NCES) of the U.S. Office of Education. The survey was directed by Alexander M. Mood. In addition to its own staff, NCES used the services of outside consultants and contractors. James S. Coleman of Johns Hopkins University had major responsibility for the design, administration, and analysis of the survey. Ernest Q. Campbell of Vanderbilt University shared this responsibility and, in the case of the college subsamples, assumed the greater part of it. Frederic D. Weinfeld served as project officer.

The survey addressed itself to four major questions:

1. To what extent are racial and ethnic groups segregated from one another in the public schools?
2. Do the schools offer equal educational opportunities in other respects?
3. How much can students be said to learn, judged by their performance on standardized achievement tests?
4. What kinds of relationship may be supposed to exist between the level of a student's achievement and the kind of school he attends?

Work was started on the survey in the spring of 1965 with a view to administering the questionnaires and tests that fall. Approximately 70 percent of the schools that were requested to participate in the study actually did so (the colleges were made the subject of a smaller and separate survey). This entailed testing and surveying some 650,000 students, together with their teachers, principals, and superintendents, in approximately 4,000 public schools throughout the country.

On the basis of competitive bids, the Educational Testing Service of Princeton, N.J., was awarded the contract for conducting the Equality of Educational Opportunity Survey, including test administration, test scoring, data processing, and data analysis. It also consulted on various aspects of the survey and convened an advisory panel to aid in its design and analysis.

The survey used a 5-percent sample of schools. This was a two-stage, self-weighting, stratified cluster sample. The primary sampling units (PSU's) in the first stage were counties and Standard Metropolitan Statistical Areas (SMSA's). The PSU's in the second stage were high schools. When one was drawn in the sample the elementary schools feeding into that school were automatically included in the sample as well. Since the Equality of Educational Opportunity Survey was primarily concerned with the children of minority groups, and since these groups constituted only about 10 percent of the total school population, the schools were stratified according to the percentage of nonwhite students contained by each. Thus strata with higher percentages of these students were given larger sampling ratios and so were sampled more heavily. The final result was that over 40 percent of the students in the survey were from minority groups.

Separate questionnaires were administered to teachers, principals, superintendents, and students at each of the grade levels studied. The teacher questionnaire contained some 72 items covering such topics as professional training, type of school and student preferred, opinions on issues and problems of integration (busing, compensatory education, etc.), and problems existing in the school. The final part of this questionnaire was a voluntary test consisting of 30 contextual vocabulary items; its purpose was to measure the teacher's verbal facility. However, the main source of information about the school was the 100-item principal questionnaire. It covered school facilities, staff, programs, racial composition, problems, curriculums, extracurricular activities, and many other school characteristics. Of course, there were also questions on the personal background and training of the principal and his opinions on problems of integration. The picture given by the teacher and principal questionnaires was further enlarged by the superintendent questionnaire, which consisted of 41 questions. These dealt not only with various aspects of the school system itself, including its expenditures, but with the superintendent himself and his attitudes toward current educational issues. Finally, detailed factual and attitudinal data about the students were obtained in the same way. Since this report focuses on the students, let us describe the student questionnaires in some detail.

The act required that the survey be made "at all levels." For reasons of economy, it was decided to administer the tests to a selection of grades that would be representative of the entire range. The grades chosen were the 1st, 3d, 6th, 9th, and the 12th, and different questionnaires were used for each grade level. In addition to questions on home background and on the usual personal and school characteristics, there were questions on attitude toward school, on race relations, and on life in general. Representative examples are: How good a student do you want to be in school? If you could be in the school you

[1] Substantial portions of this chapter have already appeared in *A Study of the Achievement of Our Nation's Students* (Mayeske et al., 1972b). However, they have been reprinted here, with only minor revisions, because they provide background essential for understanding the present study, which is designed to stand by itself.

wanted, how many of the students would you want to be white? Good luck is more important than hard work for success (agree or disagree).

It had been decided that the yardsticks for measuring the detrimental effects of poor school facilities and characteristics were to be tests of the various school-related skills. Thus the survey's test battery was planned as an integral part of the entire research design. The objective was to obtain as much test data as possible within the limitations of time and available resources. Two of the basic skills chosen were reading comprehension and mathematical ability, since these two areas are common to all school curriculums and all grade levels. Another area deemed important was the student's general level of knowledge, regardless of its source. A general information test was therefore included in the test battery. Two other ability tests were used to measure the students' verbal and ratiocinative skills.

Following this survey a report entitled "Equality of Educational Opportunity," under the principal authorship of James S. Coleman, was submitted to the President and the Congress on July 2, 1966. This report has become known as the Coleman Report; the reader is referred to it for further details (Coleman et al., 1966).[2]

The findings from the Coleman Report that are of particular relevance to this study can be summarized in a very general way as follows:

1. Family background is of great importance for achievement.
2. The relationship of family background to achievement does not diminish over the years of school.
3. Of the effect of variations in school facilities, curriculum, and staff upon achievement, only a small part is independent of family background.
4. Of the school factors, those that have the greatest influence on achievement (independently of family background) are the teacher's characteristics, not the facilities and curriculum.
5. The social composition of the student body is more highly related to achievement, independently of the student's own social background, than is any school factor.
6. Attitudes such as sense of control of the environment, or a belief in the responsiveness of the environment, were found to be highly related to achievement, but appear to be little influenced by variations in school characteristics.

In summary, the authors of the Coleman Report concluded that:

> . . . the schools bring little influence to bear on a child's achievement that is independent of his background and general social context; and that this very lack of an independent effect means that the inequalities imposed on children by their home, neighborhood and peer environment are carried along to become the inequalities with which they confront adult life at the end of school. For equality of educational opportunity through the schools must imply a strong effect of schools that is independent of the child's immediate social environment and that strong independent effect is not present in American schools.[3]

[2] Op. cit. (Foreword, p. iii)

1.2. A STUDY OF OUR NATION'S SCHOOLS

The Coleman Report was only the first analysis of these data, and it was planned to conduct further analyses. In order to accomplish this objective, a special analysis group was formed in the National Center for Educational Statistics (NCES). The first efforts of this group culminated in a report entitled "A Study of Our Nation's Schools" (Mayeske et al., 1972a), hereafter called the School Study. This report is summarized below; much of it is drawn upon in the present study.

The School Study addressed itself to the following question: How do the school's characteristics influence such things as the achievement level of all the students in the school? However, before an answer could be obtained to this question the following technical problems had to be dealt with:

1. How could discrete categorical variables such as "father's occupation" best be scaled so that they could be meaningfully interpreted and related to other variables of interest?
2. How could provision be made for nonlinear or curvilinear relationships that might otherwise remain obscured?
3. How could estimates be made of missing data, particularly when the very students who failed to provide an answer to a question were of great interest?
4. How could the more than 400 variables be reduced so that the task of data processing and analysis would become less complex?

To perform the kind of analysis required and at the same time resolve the above problems a number of logical steps were evolved and translated into the necessary computer programs (see the appendix). The statistical tools mainly used were regression analysis and partition of multiple correlation. As a result, we were able to distinguish between:

1. Percentage of school outcome associated with the distinguishable influence of the school's characteristics.
2. Percentage of school outcome associated with the distinguishable influence of the student's social background.
3. Percentage of school outcome that could just as well be associated with either one.

The conclusions that were obtained are stated below in the form of a series of hypotheses.[4] Some of the concepts and methods used to build these hypotheses are described in later sections of this chapter.

1. Very little of the schools' influence on their students can be separated from the influence of the latter's social backgrounds. Conversely, very little of the influence of the students' social backgrounds can be separated from the influence of the schools. The children who benefit

[3] Ibid., p. 325.

[4] In these hypotheses, "student's social background" refers to the set of three student body social background variables known as Socio-Economic Status, Family Structure, and Racial-Ethnic Composition of the Student Body. "Characteristics of the school" refers to a comprehensive set of 31 school variables (Mayeske et al., 1972a). A subset of 10 of these that figured most prominently in school outcomes and in individual student achievement is described in a later section of this chapter.

most from their schooling are those who:

(a) Come from the higher socioeconomic strata rather than from the lower socioeconomic strata.
(b) Have both parents in the home rather than only one or neither parent in the home.
(c) Are white or Oriental-American rather than Mexican-American, Indian American, Puerto Rican, or Negro.

2. Until the 12th grade, the distinguishable influence of the student's social background, that is, the part of it that can be separated out, is usually larger than the distinguishable influence of the school. At the 12th grade, however, the distinguishable influence of the school is greater than the distinguishable influence of the student's social background for most of the motivational and attitudinal outcomes, while the opposite is true for achievement.
3. The common influence of the school's characteristics and the student's social background on the attitudinal and motivational outcomes differs for the different grade levels. For achievement, however, the common influence is consistently larger than either one alone. This common influence increases the longer the student stays in school.
4. Schools that perform well on one outcome tend also to perform well on other outcomes. These performances tend to facilitate and reinforce one another. For the attitudinal and motivational outcomes a school's generalized favorable performance has a large distinguishable influence. It also has a common influence with the student's social background. For achievement, the influence of a generalized favorable performance is manifested in common with the school's characteristics and the student's social background.
5. The school variables most heavily involved in school outcomes are those concerned with actual characteristics of the school's personnel, as distinguished from the school's physical facilities, pupil programs and policies, and even personnel expenditures, including teachers' salaries.
6. Chief among these characteristics of school personnel are ones that reflect experience in racially imbalanced educational settings. Most nonwhite teachers had attended predominantly nonwhite educational institutions and were teaching predominantly nonwhite students. Nonwhite educational settings, it was suggested, tend to have associated with them lower levels of achievement and motivation, as well as less favorable socioeconomic and family conditions. The result is less adequate preparation than that received in predominantly white institutions.

1.3. A STUDY OF THE ACHIEVEMENTS OF OUR NATION'S STUDENTS

Unlike the School Study, the Achievement Study (Mayeske et al., 1972b) used the individual student as the unit of analysis. The following major questions were explored:

1. What roles do different aspects of the student's family background play in the development of his achievement?
2. What roles do different aspects of the school play in the development of individual student achievement when they are juxtaposed with family background factors?

These questions were explored for students in different geographic regions of the country, for students of different racial and ethnic group membership, and for boy-girl differences. Although this study made use of the same data as the previous two, it covered a greater number and variety of variables and a larger sample of students than the Coleman Report. However, it not only confirmed many of the Coleman Report's findings but also extended and refined them.

The main findings of the Achievement Study were as follows:

1. Average achievement is highest for whites, who are followed closely by Oriental-Americans, who are in turn followed by Indian Americans, Negroes, Mexican-Americans, and Puerto Ricans. The last four groups cluster fairly closely together. For all groups, this ordering is fairly consistent throughout the years of schooling.
   (a) Differences in average achievement among the groups is almost 5 times greater than differences between males and females within each group.
   (b) At times, the extent to which these groups differ across regions of the country approaches the extent to which they differ from whites.
2. The highest proportion of the total differences among students in achievement that can be associated with their membership in one of the six racial-ethnic groups is 24 percent. After allowance is made for various factors that are primarily social in nature, this proportion drops to 1 percent. The factors in question are the family's social and economic well-being, the presence or absence of key family members, the aspirations that a child and his parents have for his schooling together with the activities in which they engage to support these aspirations, the region of the country lived in, and the type of school attended.
3. The presence or absence of key family members plays only a small role in achievement for Negroes and whites, but a much larger role for the other groups. This is true both before and after allowance has been made for the social and economic well-being of the family. It is also true for all the different regions of the country.
   (a) Boys' achievement levels are more likely to be affected by the presence or absence of key family members than girls'.
   (b) A family's social and economic well-being almost always plays a greater role in achievement than does the presence or absence of key family members.
4. The aspirations that both the student and his parents have for his schooling, the activities that they engage in to support these aspirations, and the student's own outlook on life—in short, the motivational aspects of family life—all play a greater role in his achievement than do either the family's social and economic well-being or the presence or absence of key family members.
   (a) There is, however, a considerable amount of overlap between the motivational aspects of family life and the others.

(*b*) Among the motivational aspects of family life, the educational and occupational aspirations of boys play a somewhat greater role in their achievement than do the other aspects. For girls, the opposite is true.

5. When the role of all these family background factors[5] in achievement is compared with that of the type of school attended, the percentage of achievement that can be associated with each is: family background, 48 percent; and type of school attended, 10 percent. The remaining 42 percent is common to both sets of factors.
   (*a*) Among the aspects of the school attended, the achievement and motivational levels of the student body play a role in the individual student's achievement about 6 times greater than that of any of the remaining school characteristics.
   (*b*) Of the latter, the teaching staff's attributes are more influential than such attributes of the school as its facilities, policies, or kind of program offered.

Throughout the Achievement Study it was noted that a student's beliefs about his ability to influence his life and to improve his lot by means of education figure importantly in his academic achievement. This is especially true of many minority group students. We therefore decided to investigate these beliefs in a separate study. The present study reports the results of our efforts.

1.4. THE PRESENT STUDY

The major questions for which answers are sought in this study are:

1. What roles do the various aspects of a student's family background and achievement play in the development of his attitude toward life?
2. What roles do the various aspects of the school play in the development of an individual's attitude toward life, as compared with an individual's family background factors and achievement?

These questions are explored for students of both sexes and all racial-ethnic groups in the different geographic regions of the country. Ideally, we would have liked to study these questions for the same students as they progressed through their years of schooling. However, the data were cross-sectional in nature; viz, they were collected from students at different grade levels at one point in time. Consequently, when we made inferences about trends over time, it was with great caution. The techniques of inference are fully described in the appendix.

1.4.1. Definition and Description of Variables Used

This section contains a detailed description and interpretation of the variables and sets of variables used throughout the study. When indices are discussed, the reader is referred to the Technical Supplement for the weights used in their construction.[6] Most of the student indices were more adequately represented at the higher grade levels (6, 9, and 12) than at the lower ones (1 and 3). This is because at the lower grade levels fewer questions were asked about the family, and for those questions asked the teacher, not the student, had to provide the information. In many cases the teacher was unable to provide an appropriate answer. As a consequence, data from the lower grade levels are seldom used in this study.

Individual Student Indices and Variables

Socio-Economic Status (*SES*).—A student with a high score on this index has parents who come from the upper educational strata. His father is engaged in a professional, managerial, sales, or technical job, and there are two to three children in the family. They are more likely to reside in the residential area of the city or the suburbs rather than in the inner city, and their home is likely to have from 6 to 10 rooms. Intellectually stimulating materials such as books, magazines, newspapers, and television and radio programs are available in such a home.

Family Structure and Stability (*FSS*).—A student with a high score on this index has both parents in the home, his father's earnings are the major source of income, his mother works part-time or not at all, and his family has not moved around much.

Racial-Ethnic Group Membership (*RETH*).—A student with a high score on this variable is white, a student with an intermediate score is Oriental-American, and a student with a low score is Puerto Rican, Mexican-American, Indian American, or Negro. In a society that discriminates on the basis of skin color, one's membership in a particular racial or ethnic group is a social category with many behavioral implications. Accordingly, an individual's score on this variable represents his membership not only in a physical category but in a social category as well.

Expectations for Excellence (*EXPTN*).—A student with a high score on this index says that his mother, father, and teachers want him to be one of the best students in his class, and that he also desires to be one of the best in his class.

Attitude Toward Life (*ATTUD*).—A student with a high score on this index feels that people who accept their condition in life are not necessarily happier; that hard work is more important for success than good luck; that when he tries to get ahead he doesn't encounter many obstacles; that with a good education he won't have difficulty getting a job; that he would not be sacrificing his personal identity or integrity to get ahead nor does he want to change himself; that he does not have difficulty learning nor does he feel that he would do better if his teachers went slower; and that people like him have a chance to be successful.

Educational Plans and Desires (*EDPLN*).—A student with a high score on this index says that his parents want him to go to college; that he himself both desires and plans to go to college and aspires to one of the higher occupational levels; and that he feels he is one of the brighter students in his class.

Study Habits (*HBTS*).—A student with a high score on this index has frequent (weekly or more) discussions with his parents about his schoolwork and was read to regularly as a child. He spends 1 to 3 hours a day studying and 1 to 3 hours a day watching TV, would make most any sacrifice to stay in school, and has seldom stayed away from school just because he wanted to.

Achievement (*ACHV*).—A student with a high score on this

[5] I.e., the motivational aspects of family life, the family's social and economic well-being, its racial-ethnic group membership, and the presence or absence of key family members.

[6] The Technical Supplement is available from the senior author at the U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

index or composite tended to score high on all of the tests that entered into that composite. For all grade levels the tests of verbal and nonverbal ability were used as part of the composite. In addition, at grades 6, 9, and 12, tests of reading comprehension and mathematics achievement were used, and at grades 9 and 12 a test of general information was included in the composite. This inclusion of more tests at the higher grade levels represents the nature of the educational process, in which basic skills are acquired in the early years and other skills and knowledge through the use of these basic skills. As shown in the Technical Supplement, these tests at each grade level were sufficiently highly correlated to be included in a single composite.

Student Body Variables

When the values of a variable are averaged for each of the students in a particular grade level of a school, this results in what we have called a student body variable. Schools with a high mean or average on a student body variable tend to have a larger proportion of students with a high score on that attribute, while schools with a low mean or average tend to have a larger proportion of students with a correspondingly low score. The student body variables used in this study are:

Socio-Economic Status
Family Structure and Stability
Racial-Ethnic Group Membership
Expectations for Excellence
Attitude Toward Life
Educational Plans and Desires
Study Habits
Achievement

School Variables

In this study, to represent attributes of the schools *other* than student body variables, we used the following five indices and variables. A description of the meaning of each index and the variables that comprise it is given in the Technical Supplement. Another detailed description will be found in the School Study (Mayeske et al., 1972a). It should be noted that we did not have the same problems with the school variables at the lower grade levels as we had with the individual student variables (p. 4).

Teaching Conditions.—A school with a high score on this index has many teachers who say that the students in their school try hard and are of high academic ability. The teachers also see the school as having few problems of any kind and as enjoying a good reputation with other teachers not employed by the school. They also report that they are currently teaching high-ability students, that they would not prefer to work in some other school, and that they would reenter teaching as a profession if they were to start all over again.

Preference for Student-Ability Level.—A school with a high score on this index has many teachers who say that they prefer to teach in an academic school that has a strong emphasis on college preparation and a student body consisting of high-ability children of white collar and professional workers.

Training and Salary.—A school with a high score on this index has many high-salaried teachers with advanced degrees who have certification and tenure.

Verbal Skills.—A school with a high score on this variable has many teachers who attained a high score on our test of verbal skills.

Racial-Ethnic Composition.—A school with a high score on this variable has many teachers who say they are white, while a school with a low score has many teachers who claim membership in a minority group. The last two variables are included because we considered them closely related to interschool differences in the outcomes of schooling. For instance, they were shown to be related to the achievement and motivational levels of the student body before and after the school's social composition was taken into account (Mayeske et al., 1972a).

Other Sets of Variables

Throughout the chapters that follow, several other sets of variables are used recurrently. The variables that comprise each of these sets are described and analyzed in this section, and a rationale is given for including them in their respective sets.

Home Background (HB).—This label is applied to the set of variables that represent the human and material resources in the immediate home environment. When each of the racial-ethnic and sex groups is kept analytically separate, Home Background consists of the student's Socio-Economic Status, on the one hand, and Family Structure and Stability, on the other. When these different groups are kept together, a variable called Racial-Ethnic Group Membership (RETH) is often introduced into the analyses under the same general label.

Family Background (FB).—This set is comprised of the Home Background and the Family Process sets.[7] Thus Family Background covers virtually all aspects of the individual student's background. When analyses are run for each racial-ethnic group, Home Background consists only of Socio-Economic Status and Family Structure and Stability, whereas when the racial-ethnic groups are combined, Racial-Ethnic Group Membership is on occasion included as an aspect of Home Background. The relationships among these sets of variables are given in schematic form in figure 1.1.

There are in addition, four sets of variables at the school level.

School (SCH(10)).—This set consists of the 10 school variables described earlier. It is comprised of the following two subsets:

(*a*) *School Outcomes (SO(5)).*[8]—This set consists of the five student body variables of Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement. The set is sometimes divided into two subsets: Student Body's Attitude Toward Life (SATTUD), and SO(4), consisting of the other four student body variables.

(*b*) *Teaching Staff Attributes (T(5)).*—This set consists of the five teaching staff attributes of Teaching Conditions, Preference for Student-Ability Level, Training and Salary, Racial-Ethnic Composition, and Verbal Skills.

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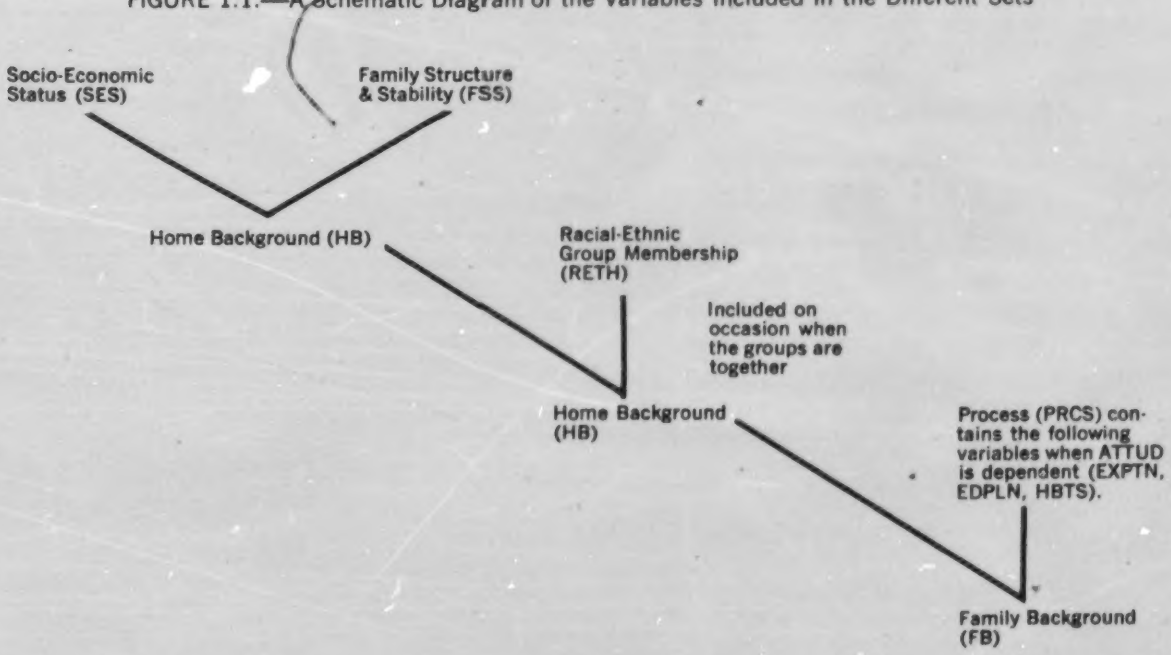
[7] Family Process was the name we gave to a set of variables, including Expectations for Excellence, Educational Plans and Desires, and Study Habits, that pertained to the attitudes and behavior of the student and his family.

[8] This set is called School Outcomes because it represents, in part, the aggregate effects of schooling. By virtue of its high correlation with the social composition of the student body, it is also a measure of the effects of residential and school segregation—schools being organized along residential lines.

FIGURE 1.1.—A Schematic Diagram of the Variables Included in the Different Sets


Socio-Economic Status (SES)
Family Structure & Stability (FSS)
Home Background (HB)
Racial-Ethnic Group Membership (RETH)
Included on occasion when the groups are together
Home Background (HB)
Process (PRCS) contains the following variables when ATTUD is dependent (EXPTN, EDPLN, HBTS).
Family Background (FB)

Family Process (PRCS).—This set is the exact counterpart of Family Process at the individual level. Consequently, the same name is used. Its composition varies according to the dependent variable, as follows:

Dependent Variable	*Composition of Family Process at School Level*
Student Body Attitude Toward Life	The four student body variables of: Expectations for Excellence, Achievement, Educational Plans and Desires, and Study Habits

This family process set at the school level is normally used only for analyses among schools.

Geographic Groupings.—In a number of chapters comparative analyses are conducted for different geographic groups. The four basic groupings are: Metropolitan (MET); Nonmetropolitan (NONMET); North; and South. The standard census tract was used to define metropolitan and nonmetropolitan areas as used in the sampling design. The South was defined to include the 16 Southeastern and Southwestern States of: Alabama, Arkansas, Arizona, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Included as North were all the remaining States.[9]

1.5. THE ATTITUDE TOWARD LIFE OF OUR NATION'S STUDENTS: AN OVERVIEW

The Achievement Study showed that a student's outlook on life is substantially related to his academic achievement before allowance has been made for any other aspects of his background. Moreover, the relationship persists, though in weaker form, even when allowance is made for such factors as family background and type of school attended. The study also showed that a student's outlook on life is closely related to his racial-ethnic group membership. Minority group children, for instance, are far less likely than those from the majority group to feel that they have a chance to be successful. Because of these relationships, and because it seemed to us that one's belief about his ability to influence the course of his life may well affect the efforts he puts forth, we decided to investigate this subject further.

Using the same data as in our previous reports, we constructed an index out of either 5 or 11 items that reflected the student's view about life, particularly as they pertained to education.[10] A student with a high score on this index feels that people who accept their condition in life are not necessarily happier, and that hard work is more important for success than good luck. He also believes that if he tries to get ahead he will not encounter obstacles, and that with a good education he will have no difficulty in getting a job. However, he would not sacrifice everything to get ahead, and would not want to change himself just for that purpose. He does not think he would do better if his teachers went slower; he does think people like him have a chance to be successful. We interpreted the common influence exerted by these variables as reflecting the portion of the student's outlook on life that had its roots mainly but not wholly in school related experiences. We have called this index Attitude Toward Life, or ATTUD for short.

The primary statistical tools used were regression analysis and partition of multiple correlation. Using these tools we were able to distinguish between, for example:

1. The percentage of Attitude Toward Life that could be

[9] On one occasion, the North was subdivided into two sets: (1) the Far West and the Rocky Mountain States of Alaska, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming; and (2) Other, consisting of the 23 other Northern States. On another occasion, analyses were run for only the Mid-Atlantic and the Far Western States.

[10] An index of 5 items was used at the 6th grade and 1 of 11 items at the 9th and 12th grade.

associated with the distinguishable influence of Home Background.
2. The percentage of Attitude Toward Life that could be associated with the distinguishable influence of Family Process.
3. The percentage of Attitude Toward Life that could not be associated with the distinguishable influence of Home Background or Family Process, but was common to both.

The first question we asked was: How do various groupings of students differ from one another in their average Attitude Toward Life? We compared students of both sexes from all the different racial-ethnic groups in every region of the country. We found that the students who scored highest on our ATTUD index were those who identified themselves as being white. Students who identified themselves as being Oriental-Americans were next highest, while Negroes, Indian Americans, and Mexican-Americans ranked third highest. Lowest of all were those who identified themselves as Puerto Rican. Within each of these groups, girls had consistently higher scores than boys, although this difference was never large. Actually, differences among the six racial-ethnic groups were about twice as great as were girl-boy differences within each group. We conjectured that the girls' slightly more optimistic outlook on life might be due to their characteristically less aggressive way of handling problems coupled with a generally lower level of ambition. However, in our analytic work we were not able to distinguish the influence of these from that of other background characteristics.

It should not be assumed from this brief account that values of ATTUD were uniformly distributed by ethnic group. On the contrary, the values observed for a particular group in different regions were sometimes almost as different from one another as the group in question was from the whites nationally. For example, Negro, Mexican-American, and Puerto Rican students differed across regions of the country by two-thirds of the extent to which they differed from whites. Comparable values for Indian and Oriental-American students were two-fifths and one-third, respectively.

We recognized that not only the groups but the students within each group differed substantially from one another. For example, as we have said, students who identified themselves as white had a higher average score on ATTUD than the students of any minority group. However, within the so-called white group some had a higher score on ATTUD than others. This was also true of the minority group students. Such considerations impelled us to ask:

1. Can we explain the differences among individual students in their Attitude Toward Life—and, if so, how far?
2. What kinds of factors play the greatest explanatory role?

With regard to the first question we found that about one-fourth of the differences among whites in their Attitude Toward Life could be explained by Family Background and Achievement. For the other groups, the corresponding value was one-third. When we included factors pertaining to the type of school attended, as represented by our index of 10 school variables, roughly one-third of the differences among whites in their Attitude Toward Life were explained. For the other groups, however, corresponding values were usually larger by some 4 to 9 percentage points. Although the magnitude of these percentages differed by grade level, the relative order of the groups tended to remain the same. It follows that Attitude Toward Life can be more fully explained by, or is at least more sensitive to, Family Background, Achievement, and school factors for minority group students than it can be for white students. Just why this should be so, we cannot say. However, one might conjecture that the greater variety of circumstances with which minority group children have to cope may increase the dependence of their Attitude Toward Life on these factors.

What are some of these circumstances? We reasoned that the presence or absence of key family members in the home, which was represented by one of our indices called Family Structure and Stability (FSS), might play a key role. However, we found only a small-to-moderate relationship between FSS and ATTUD, and even this relationship tended to vanish after allowance had been made for other aspects of the student's family background, achievement, and type of school attended. Moreover, this tended to be so for each of the racial-ethnic groups. Although boys' Attitude Toward Life did show greater sensitivity to the Family Structure index than girls', the difference was seldom large. We conjectured that this might have been brought about by the presumably greater impact of father absence on boys than on girls. But since the role of Family Structure in Attitude Toward Life vanished as Family Process was taken into account, we wondered if some other aspect of Family Background might be playing a greater role.

Next, we investigated the role in Attitude Toward Life of the three family process factors (p. 18). We found a moderate-to-high degree of relationship with Attitude Toward Life for each group before any other factors had been allowed for. The relationship persisted, although its magnitude was reduced, after the social and economic well-being of the family, the presence or absence of key family members, the student's achievement level, and the type of school he attended had all been allowed for.[11] Of the three factors, the two that pertained to the more immediate kinds of parent-child involvement, such as reading to him at the preschool stage and talking with him about his schoolwork after he had started school, played a greater role in Attitude Toward Life than did longer range educational and occupational aspirations. However, there was a substantial portion of Attitude Toward Life that could be explained only by both types of influence working together.

We next examined the role in Attitude Toward Life of the type of school attended. A low-to-moderate relationship was observed for each group. However, most of this relationship vanished after allowance had been made for a student's Family Background and Achievement. In consequence, we concluded that the possible effect of the type of school a student attended could not be separated from the possible effects of his Family Background and Achievement. We also tried to discover which aspects of the school a student attended might be playing the largest role in his Attitude Toward Life. We found that Student Body Characteristics, as defined by the students' achievement and motivational levels, played an overwhelmingly greater role than Teaching Staff Characteristics. This is not to say that the teaching staff had no effect on Attitude Toward Life. But it was a small effect, manifested in conjunction with Student Body Characteristics. We also inquired as to which aspect of Student Body Characteristics might be playing the greatest

[11] Boys' Attitude Toward Life also showed a slightly greater sensitivity to family process factors than girls'.

role in the individual student's Attitude Toward Life. We found it was the Attitude Toward Life of the entire student body. In other words, the outlook of the students one goes to school with plays a major role in one's own outlook. However, the role of one's fellow students' level of achievement and motivation cannot be ruled out.[12]

In summary, we found that in the explainable differences among students in their Attitude Toward Life, the magnitude of the role that could be uniquely attributed to Family Process was about twice that of School Characteristics, and that the role of the latter was in turn about twice that of Achievement.[13] The role of Home Background, on the other hand was completely intertwined with these other factors, which were also intertwined with one another. Since overlap usually indicates some degree of cooperative influence, we shall discuss it briefly in this instance. The greatest overlaps were: HB-PRCS-SCH-ACHV; HB-ACHV-PRCS; and ACHV-PRCS. Roughly half the total overlap was accounted for by: HB-PRCS; HB-ACHV-SCH; and PRCS-SCH. We interpreted these overlaps as reflecting, in part, the interplay of the various factors with one another over time as they affected Attitude Toward Life.

We have seen that students who identify themselves as white have substantially higher scores on Attitude Toward Life than do most minority group students. In addition, we have seen that for minority group students Attitude Toward Life shows a greater dependence on a range of factors pertaining to their family background, academic achievement, and type of school attended. Further, for each group as well as for all students, we have seen that a class of variables pertaining to what we might term "educationally related child-rearing activities" plays a greater role in Attitude Toward Life than does any other class of variables. Of these latter, the factors that reflect the more immediate kinds of personalized involvement play a greater role than do longer range educational and occupational aspirations. It is also a striking fact that a student's schoolmates play a greater role in his Attitude Toward Life than does his own school performance. However, the latter plays a greater role than either his family's social and economic well-being or its structure and stability. In fact, the role of this latter class of factors is completely intertwined with that of all other classes. We concluded that the effects of many of these classes of variables were inseparable from one another.

But what are the implications of these findings? Why should majority group students view their ability to influence their lives more favorably than minority group students? Is there anything that can be done to redress these inequities? We should recognize first of all that the views of a student about his ability to influence his life through the avenue of education contain a degree of accuracy. Members of minority groups are generally well aware of the barriers to the improvement of their social well-being offered by discrimination in employment, housing, and schooling. Also, the residential segregation of minority groups tends to reinforce the views they hold in common. Clearly, elimination of these discriminatory practices would affect these groups' attitude toward life for the better.

Second, much of child rearing as it is currently practiced is a happenstance affair. It seems unlikely that many parents are aware of the effect the different practices they engage in may have on their children, or of the manner in which these practices may contribute to their children's well-being, emotional no less than intellectual. Much could be done by the educational media to create such an awareness.

Third, both the performance criteria and the reward structure of schools need to be altered. The individual student's performance could be made more dependent upon his own learning needs rather than upon the needs of his peers. All too often the school creates certain rather arbitrary tasks that serve merely to categorize students instead of assessing their level of achievement. In addition, school-performance criteria need to be expanded to include a variety of tasks and activities sufficient to give more students a sense of accomplishment. The schools' reward structure needs to be altered so that children for whom the traditional marks of academic excellence are not especially meaningful can somehow be brought within the reach of praise and blame. Use might even be made of student body influence as a positive factor.

Finally, it should be possible to investigate the negative motivational impact of attempting to change the language habits and patterns of first-grade students who do not speak standard English. Nonstandard English, if that is what the student has been brought up to speak, interferes with the learning of standard English. The effect of discrimination by educators against nonstandard English is a phenomenon that needs more attention than it has so far received.

We should not delude ourselves into thinking that these conditions can be remedied overnight. Some require basic social changes, while others require intensive research. All, however, appear of sufficient import to warrant sustained attention.

1.6. SUMMARY

The Equality of Educational Opportunity Survey, which was carried out by the U.S. Office of Education under the Civil Rights Act of 1964, attempted to determine: the extent of racial and ethnic segregation in the public schools; whether or not the schools offered equal educational opportunities in other respects; the amount that students could be said to learn, judged by their performance on standardized achievement tests; and the kinds of relationship that might be supposed to exist between a student's achievement level and the school he attended. The study involved some 650,000 students, with their teachers, principals, and superintendents, in about 4,000 public schools throughout the country. For reasons of economy, only students in grades 1, 3, 6, 9, and 12 were included in the analysis.

The results of this survey were published in a report entitled "Equality of Educational Opportunity," better known as the Coleman Report (Coleman et al., 1966). The authors of the report found that: family background was very important for student achievement and did not diminish in importance over the school years; only a small part of the variation in school facilities, curriculum, and staff had an effect that was independent of family background, and of this small part by far the most influential was the set of variables called teacher's characteristics; the social composition of the student body was more highly related to individual achievement than any characteristic of the school; and holding an optimistic attitude to-

[12] What we have here termed level of motivation actually refers to the aggregate parent-child involvement factors. At the individual student level, these are the variables denoted collectively as Family Process.

[13] See table 5.7, p. 54.

ward one's chances in life, although related to achievement, did not seem much affected by differences in schools. The authors concluded that, since the schools lacked a strong independent effect on achievement, they could not of themselves provide equality of educational opportunity.

Further analyses of these data were undertaken by the authors of the present report. The first of these analyses to be published was "A Study of Our Nation's Schools," here referred to as the School Study (Mayeske et al., 1972a). The general purpose of the School Study was to distinguish the influence of the school's characteristics from all other kinds of influence. We concluded that the children who benefited most from their schooling were those who were white or Oriental-American and who came from well-to-do homes in which both parents were present. We also found that: schools that performed well on one educational outcome tended to perform well on other outcomes; and the most influential school variables were those connected with characteristics of the school's staff, especially whether they had attended predominantly nonwhite educational institutions.

The second of these analyses to be published was "A Study of the Achievement of Our Nation's Students," here referred to as the Achievement Study (Mayeske et al., 1972b). The purpose of this study was to determine the part played in the individual student's achievement by various aspects of his family background, and to compare this in each instance with the part played by various aspects of his school. We found that: average achievement was highest for whites and Oriental-Americans, although there were considerable regional variations; racial-ethnic group membership accounted for only 24 percent of these differences before allowance was made for various socioeconomic background factors, and for only about 1 percent after such allowance had been made; the presence or absence of key family members had less effect on the achievement of whites and Negroes than on that of other groups; educationally related child-rearing activities played a greater role in a student's achievement than either his family's socioeconomic status or the presence or absence of key family members; family background factors played an independent role in achievement nearly 5 times that of school factors, and among the latter the role of the student body's values and achievement level was 6 times that of any other school factor.

In the present analysis, we concentrated on a set of variables that we called Attitude Toward Life. This included a student's feelings about the importance of hard work (as opposed to luck) for success, about his own chances for success, and about the relationship between success and education. In general, we wanted to find out what factors helped a student to develop the belief that he was capable of influencing his own future, since such a belief appeared positively related to achievement. We found that: minority group children were far less likely to believe in the chances of their own success; that a parent who read to a child or talked to him about his schoolwork was more likely to encourage the development of such beliefs than one who merely expressed long-range aspirations for the child; that the effects of school characteristics on Attitude Toward Life could not be separated from those of Family Background and Achievement; that a far greater role was played in the individual student's Attitude Toward Life by his fellow students' characteristics than by his teachers'—greater, even, than that of his own school performance. We concluded that the minority group students' negative estimate of their chances for success was, on the whole, an accurate reflection of the discrimination they were likely to encounter, and that any substantial improvement in this situation would require changes throughout the society. However, we concluded that much could also be done by educating parents in better child-rearing practices, and by altering the performance criteria and reward structure of schools. The negative effect of imposing standard English on children brought up to speak nonstandard English was also a topic that needed investigation.

2. Family, Achievement, and Attitude Toward Life

The extent to which one tries to influence the course of his life undoubtedly depends on how strongly he believes that such action will do any good. This in turn may depend on a variety of circumstances. The physical well-being of one's early years, relationships with parents, siblings, and peers, opportunities for different kinds of experience, and the actual experience of success and failure can all play an important role in shaping one's outlook on life. This chapter explores in some detail the roles of family background and achievement, irrespective of region and school attended.

2.1. FAMILY BACKGROUND, ACHIEVEMENT, AND RACIAL-ETHNIC GROUP MEMBERSHIP

It is a common observation that most minority group members fare less well in our society than most whites. It behooves us, therefore, to examine the ways in which these groups differ in Family Background and Achievement. Table 2.1 gives the number of ninth-grade students in each of the groups that we shall be studying in this chapter. It will be seen that for each group except Negroes there are slightly more males than females. However, for the group made up of all students combined, this disparity is not quite so great. Similarly, there is a proportionately greater representation of whites and Negroes in the sample.[1] Ninth-grade students were used as the primary group for analysis both because there was a greater number of students at this grade than at others, and because the indices were most reliably and comprehensively measured at the 9th and 12th grades.[2]

Table 2.2 gives the rank order of each group on each of these measures. The values are obtained by ranking the group means on each index. For example, the ranks for Socio-Economic Status are obtained by assigning a *1* to the group with the highest mean score, a *2* to the group with the next highest mean, and so on until each group has been assigned a rank. The same procedure is then repeated for the next index. It will be seen from table 2.2 that there is a great deal of consistency in a group's relative standing on each of these indices: groups that have a high mean on one tend also to have a high mean on the other, and groups that are low on one are low on the others. Overall, whites and Oriental-Americans rank highest, while Puerto Ricans and Indian Americans rank lowest.

Another way of demonstrating this type of statistical dependence is by computing the correlation of the ranks on one index with those on another index. Such correlations are shown in table 2.3, where there is a very high degree of intercorrelation among the group means on these indices. A measure of the extent of this intercorrelation can be obtained by computing the principal components of the correlations and then observing the percentage of total variance accounted for by these components.[3] If the percentage of variance is very high (i.e., near unity) for the first principal component it indicates that there is almost complete dependence among the variables. On the other hand if a number of principal components are required to account for the total variance, this indicates that there are "islands of dependence." The greater the number of components the more there are of these islands. In the extreme case in which all variables are uncorrelated, the number of principal components required will be equal to the number of variables. A principal components analysis of the correlations in table 2.3 showed that 89 percent of the variance could be accounted for by the first principal component and another 4 percent by a second component. The high percentage for the first component indicates that there is a high but not complete degree of linear dependence among the relative standings of these six racial-ethnic groups on each of these indices.

However, our basic interest is in the individual student and how different aspects of his background may affect him. Since one aspect of his background is his racial-ethnic group membership, we wanted to incorporate it into our analyses. First, however, a student's membership in a number of possible discrete groups had to be coded in some manner. In previous studies in this series our primary variable of interest was Achievement. We therefore assigned a code value that corresponded to the mean score on Achievement attained by members of the racial-ethnic group in question. Table 2.4 will help to explain this procedure. Here, the two right-hand columns show the percentage of students in each racial-ethnic group and their mean scores on Achievement.[4] In addition, a score was computed for those students who failed to indicate their group membership (the "no response" category). The variable called Racial-Ethnic Group Membership (RETH) was created by assigning each student the mean score on Achievement (ACHV) for the group in which he indicated that he was a member. For example, a student who indicated that he was an Indian American was assigned a score of 44.839, one who indicated that he was Oriental-American was assigned a score of 51.024, and so on.[5] The adoption of this coding or scaling procedure enables one to order the groups on a continuum from high to low and to incorporate this continuum in the analysis as a variable. The variable so created expresses intergroup differences in quantitative form. Thus, a high score on RETH indicates that a student is white or Ori-

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[1] In all analyses weighted values rather than sample values were used (see the appendix).

[2] It should be noted, however, that fewer dropouts had occurred by the 9th grade.

[3] The percentage of total variance accounted for by a principal component is computed by dividing the amount of variance accounted for by a component by the number of variables included in the matrix (see Horst, 1965).

[4] All scores are expressed in terms of a distribution with a mean of 50 and a standard deviation of 10.

[5] When the respective mean value is assigned as the code for each alternative, the variable is said to be *criterion scaled* (see Beaton, 1969).

Table 2.1.—Ninth-Grade Students, by Racial-Ethnic Group and Sex

Sex	Indian	Mexican	Puerto Rican	Negro	Oriental	White	Total
Male	1,544	3,391	1,904	18,089	872	39,000	64,800
Female	1,333	2,445	1,798	19,176	803	37,753	63,308
Total	2,877	5,836	3,702	37,265	1,675	76,753	128,108

Table 2.2.—Rank Order of Racial-Ethnic Group Differences on Family Background, Attitude Toward Life, and Achievement

Set of Variables	Racial-Ethnic Group I	M	P	N	O	W
Socio-Economic Status (SES)	5	3	6	4	2	1
Family Structure and Stability (FSS)	5	3	6	4	2	1
Expectations for Excellence (EXPTN)	5	4	6	3	2	1
Attitude Toward Life (ATTUD)	4	3	6	5	2	1
Educational Plans and Desires (EDPLN)	4	5	6	3	1	2
Study Habits (HBTS)	5	4	6	3	2	1
Achievement (ACHV)	3	4	6	5	2	1

NOTE.—I=Indian; M=Mexican; P=Puerto Rican; N=Negro; O=Oriental; W=White. Family Background consists of all the row variables except ATTUD and ACHV.

Table 2.3.—Rank-Order Correlation of Racial-Ethnic Group Differences on Family Background, Attitude Toward Life, and Achievement.

Set of Variables	Set Number: 1	2	3	4	5	6	7
1. Socio-Economic Status (SES)	100	100	94	94	77	94	83
2. Family Structure and Stability (FSS)	100	100	94	94	77	94	83
3. Expectations for Excellence (EXPTN)	94	94	100	83	89	100	77
4. Attitude Toward Life (ATTUD)	94	94	83	100	71	83	94
5. Educational Plans and Desires (EDPLN)	77	77	89	71	100	89	77
6. Study Habits (HBTS)	94	94	100	83	89	100	77
7. Achievement (ACHV)	83	83	77	94	77	77	100

NOTE.—These are Spearman rank-order correlations based on the ranked means of the 6th racial-ethnic groups from table 2.2. Family Background consists of all the row variables except ATTUD and ACHV.

Table 2.4.—Percentage of 9th-Grade Students and Their Average Composite Achievement Score, by Racial-Ethnic Group

Category	Racial-Ethnic Group	Percentage	Mean ACHV
1	Indian American	1.9	44.839
2	Mexican-American	4.4	43.599
3	Puerto Rican	1.6	40.643
4	Negro	16.0	41.609
5	Oriental-American	0.8	51.024
6	White	73.0	52.788
7	Other	1.0	45.707
0	No Response	1.3	39.976
	Total	100.0	50.000

NOTE.—The total number of students is 133,136. The standard deviation for the total is equal to 10. These figures are weighted by the sampling ratios for the different groups.

Table 2.5—Simple Correlation Coefficient (r) of Racial-Ethnic Group Membership With Family Background, Attitude Toward Life, and Achievement, by Sex[1]

Set of Variables	Total	Male	Female
Socio-Economic Status (SES)	38	36	39
Family Structure and Stability (FSS)	30	29	32
Expectations for Excellence (EXPTN)	12	14	10
Attitude Toward Life (ATTUD)	27	27	27
Educational Plans and Desires (EDPLN)	13	18	07
Study Habits (HBTS)	18	17	20
Achievement (ACHV)	46	44	49
Multiple Correlation [2]	55	52	58

[1] These analyses are based upon 128,108 9th-grade students, as shown in table 2.1.

[2] Multiple correlation of all 7 row variables with Racial-Ethnic Group Membership. Family Background consists of all the row variables except ATTUD and ACHV.

ental-American, whereas a low score indicates that he is from one of the remaining groups shown in table 2.4.[6]

In this study our primary variable of interest was the student's Attitude Toward Life, not his Achievement. Ideally, therefore, we should have formed a measure of racial-ethnic group membership by assigning each student the mean score attained by his group on Attitude Toward Life. Had we done this, however, the variable so created would have been highly related to the one we created using the group means for Achievement. This would have been so because the relative order of the group means on Achievement and Attitude Toward Life are very similar. As table 2.3 shows, the correlation of the group means on these variables is .94, and would have been unity were it not for the crossover in ranks that takes place for the Mexican and Indian groups in moving from Achievement to Attitude Toward Life (see table 2.2). These differences are sufficiently small to allow us to use Racial-Ethnic Group Membership in this study exactly as it was created for the earlier studies (Mayeske et al., 1972a, 1972b). The differences are also small enough to allow us to compare the role played by Racial-Ethnic Group Membership in these different studies.

The correlates of Racial-Ethnic Group Membership (RETH) with Achievement (ACHV) and with the variables of the Family Background (FB) set are shown in table 2.5. It will be seen that the largest single correlate of RETH is ACHV, which is as one would expect, considering how Racial-Ethnic Group Membership was constructed. The next highest values are for Socio-Economic Status (SES), Family Structure and Stability (FSS), and Attitude Toward Life (ATTUD). Somewhat lower than these and closer together in magnitude are the correlates for Study Habits (HBTS), Educational Plans and Desires (EDPLN), and Expectations for Excellence (EXPTN). The multiple correlation of all seven of these variables with RETH shows that they possess a high degree of explanatory power. In addition, much of what the FB variables explain in RETH is independent of ACHV. This can be observed if one subtracts the squared correlation for ACHV from the squared multiple correlation for all seven variables. The resulting value is 9.1 percent.

Sex differences in these correlates are seldom large. Females have higher correlates than males for SES, FSS, HBTS, and ACHV, whereas males have higher correlates for EXPTN and

[6] Unless otherwise specified, students from the "other" and "no response" categories will not be included in the analyses. Hence, the number of students in the analysis will correspond to that shown in table 2.1,; i.e., some 5,000 below the number in table 2.4.

Table 2.6—Correlation of Sex With Family Background, Attitude Toward Life, and Achievement, by Racial-Ethnic Group (RETH)

Set of Variables	Racial-Ethnic Group [1] I	M	P	N	O	W	T	T(A)
Socio-Economic Status (SES)	01	02	−04	−03	02	01	00	00
Family Structure & Stability (FSS)	03	03	02	02	03	02	02	02
Expectations for Excellence (EXPTN)	−03	−01	−04	05	02	−01	01	01
Attitude Toward Life (ATTUD)	04	08	06	11	11	08	08	08
Educational Plans (EDPLN)	04	−02	02	08	04	−07	−04	−04
Study Habits (HBTS)	11	09	08	11	06	15	13	13
Achievement (ACHV)	01	04	04	02	03	05	04	04
Multiple Correlation [2]	15	15	15	15	12	23	19	19

[1] I=Indian; M=Mexican; P=Puerto Rican; N=Negro; O=Oriental; W=White; T=Total; T(A)=Total when dependent variable (viz, sex) is adjusted for RETH.

[2] The multiple correlation of all 7 row variables with sex group membership. Family Background consists of all the row variables except ATTUD and ACHV.

EDPLN. The male-female correlates are the same for ATTUD. The level of explanation of RETH from these seven variables, as indicated by the differences in their squared multiple correlations, is about 7 percent greater for females than for males. Similarly, the percentage of RETH that can be explained by the FB variables independently of ACHV, obtained as described above, is almost 10 percent for females as compared with 8 percent for males. Consequently, one's membership in a particular racial-ethnic group has more predictable consequences for females than for males both before and after the respective achievement levels of each group have been taken into account. These correlates should help us to understand more fully the kinds of relationships that are being introduced into the analyses when all of the racial-ethnic groups are included in the same framework, as well as the kinds of differences that are being eliminated when the groups are kept separate.

There remains one other kind of group difference that is of particular interest to us: sex. We have seen in the case of Racial-Ethnic Group Membership that the correlations of one variable with another may vary by sex. However, we have not yet examined the extent to which sex differences are associated both with Achievement and with the family background measures for each racial-ethnic group. Are the means for females on each index very much higher than those for males, or are they very similar? In order to show the nature of these relationships, the correlations of Achievement and of each family background measure with sex are given in table 2.6. Here, sex was coded as a variable, with females receiving a high score and males a low score. Hence, a positive correlation indicates that females have a higher mean score on the variables than males, while a negative correlation indicates that males have the higher score. The greater the mean difference between the sex groups on the variable, the larger is the correlation obtained.

Correlations for each of the six racial-ethnic groups are shown in table 2.6.[7] In the two right-hand columns, "T" designates "Total," indicating that all students are included in the analysis without regard to Racial-Ethnic Group Membership, and "T(A)" indicates that for "T" the dependent variable, in this case sex, was first adjusted for Racial-Ethnic Group Membership by means of partial correlation techniques. Thus the variable being analyzed in this latter case is sex adjusted for Racial-Ethnic Group Membership.

It will be seen from table 2.6 that differences between the sexes are low for nearly all variables, particularly SES and FSS. They are also low for EXPTN, but slightly higher for the remaining variables. For ATTUD, females uniformly report a more optimistic outlook than do males. Females also have better study habits and slightly higher achievement levels than males, although males have slightly higher aspirations overall. There is, however, some variation by racial-ethnic group, with white and Mexican-American males showing higher aspirations but with the opposite tendency among Indian Americans, Puerto Ricans, Negroes, and Oriental-Americans. The row labeled "Multiple Correlation" contains the correlation of these seven variables with sex as the dependent variable. These values show that groups other than whites are very similar. Oriental-Americans have the lowest correlations, while the other four nonwhite groups have correlations that are slightly higher but are nevertheless greatly exceeded by those of the whites. Thus, sex differences are more predictable or more fully explained from these variables for whites than for the other ethnic groups.

Even though these correlations were higher for Attitude Toward Life than for the other variables, statistical control of the sex variable did not yield any notably different results. This is not surprising, since the amount of variance removed from Attitude Toward Life by such adjustments is never more than 1 percent.[8] Consequently, in the remainder of this monograph mean differences among the sexes will not be used as a variable. However, since we do expect the correlations to differ at times for males and females, we will use sex as a stratifying variable.[9]

We have seen that there is a remarkably high degree of consistency in the relative standing of each of the six racial-ethnic group means on each of the family background measures as well as on Achievement. It was this consistency that allowed us to use Racial-Ethnic Group Membership, a variable created for use in the earlier studies. In this way we were able to include the racial-ethnic factor as an aspect of the individual student's Family Background.

2.2. ATTITUDE TOWARD LIFE: ITS NATURE AND CORRELATES

Although this section may appear something of a digression, the reader who takes the trouble to master its contents will find

[7] The number of students in these analyses is the same as in table 2.1, p. 12.

[8] That is, the highest correlations of sex and Attitude Toward Life are for Negroes and whites and are on the order of .11, which, when squared, yields a value of 1 percent (see table 2.5, p. 12).

[9] In other words, analyses will be run for males and females when they are kept separate, but there will be no analyses in which adjustments are made for mean differences associated with sex. This is the opposite of the procedure followed with Racial-Ethnic Group Membership.

Table 2.7.—Standard Deviation of Attitude Toward Life (ATTUD) for 9th-Grade Students, by Racial-Ethnic Group and Sex

Sex	Indian	Mexican	Puerto Rican	Negro	Oriental	White	Total
Male	4.73	5.36	6.47	6.35	4.79	3.96	4.74
Female	4.34	4.53	6.19	5.33	3.66	3.20	3.93
Total	4.56	5.04	6.35	5.89	4.35	3.62	4.38

his understanding of later sections greatly enhanced. It will be recalled that the variable we have called Attitude Toward Life (ATTUD) is really a weighted composite of 11 attitudinal items (Mayeske et al., 1972a, pp. 41–42).[10] This composite was developed empirically, by means of factor analysis; that is why all the items are correlated with one another.[11] A student with a high score on this composite feels that people who accept their condition in life are not necessarily happier, and that hard work is more important for success than good luck. He also believes that if he tries to get ahead he will not encounter obstacles, and that with a good education he will have no difficulty getting a job. He would not sacrifice everything to get ahead, and would not want to change himself. He does not think he would do better if his teachers went slower; he does think people who are like him have a chance to be successful. We have interpreted the common influence of these items as reflecting the student's outlook on life. Since this outlook has at least some of its roots in school-related experiences, we have labeled this set of variables Attitude Toward Life.

Our interest in Attitude Toward Life stems from our Achievement Study (Mayeske et al., 1972b). Here we observed that Attitude Toward Life, Racial-Ethnic Group Membership, and Achievement displayed some interdependence even after other aspects of family background, such as the level of human and material resources in the home, the expectations of student and parent for schooling, and the activities they engaged in to support these aspirations, had been taken into account. This interdependence, we reasoned, reflected the motivational aspects of membership in a racial-ethnic group that pertained to achievement, beyond what we would expect on the basis of these other family background considerations.

In addition, some degree of relationship persisted between Attitude Toward Life and Achievement even after Racial-Ethnic Group Membership and different aspects of the school attended had been taken into account. To us, these seemed to be important relationships, and ones about which we wanted to learn more. This monograph was the result of our interest.

Our first question was: How much diversity is there among students with regard to their Attitude Toward Life? As a measure of diversity we used the standard deviation, and obtained the values shown in table 2.7. It will be seen that there is a much greater diversity of Attitude Toward Life for each minority group than for the whites. This diversity is greatest for Puerto Ricans and Negroes and least for Oriental-Americans. It follows that minority group students differ more from one another in their view of life than do whites. The male-female differences are also most illuminating, for they show for each group that males differ more from one another than do females. These findings suggest that since one group differs more than the other (i.e., has more variance), it may be possible for these greater differences to support higher correlations. These are concerns to which we shall return later on.

Another question of interest is: To what extent are Achievement and the different family background measures correlated with Attitude Toward Life? The relevant correlations are given in table 2.8, from which it will be seen that the highest values for each group are for Achievement and for the three motivational variables of Expectations for Excellence, Educational Plans and Desires, and Study Habits. Which one of these four is highest and which one is lowest depends for the most part on the group under consideration. However, the values for all four variables are much higher than those for Socio-Economic Status and Family Structure and Stability. It should be noted that the values for the two last-named variables increase somewhat when all the groups are combined (see the three columns headed "Total (U)"). These increases are due to the differences on these variables among the groups entering into the analysis. In this connection, it should be noted that the highest values in nearly every case are for Oriental-American males. Since the differences in question are quite substantial, it is not surprising that the values increase. By the same token, the values are reduced when Attitude Toward Life is first adjusted for Racial-Ethnic Group Membership (see the three columns headed "Total (A)").[12] It will be seen from examination of the multiple correlations for all six of these variables with Attitude Toward Life that these are fairly substantial correlations for this kind of data, and that they are fairly similar in magnitude. However, there is a tendency, though a slight one, for the values to be greater for males than for females. The most notable exception is for Indian and Mexican-American females, who tend to have larger values. The same trend—larger correlations for Achievement, Expectations for Excellence, Educational Plans and Desires, and Study Habits than for Socio-Economic Status or Family Structure and Stability—is evident for males as for females. Clearly, the two last-named sets of variables play a lesser role than the other four in explaining Attitude Toward Life.

We are now in a position to raise yet another question, namely: To what extent is Attitude Toward Life explained by the various possible combinations of these variables? Before attempting to address this question we shall categorize these variables into sets and then arrange the sets in a simple quasi-causal order.

First, we can treat the socioeconomic status of the student's family as one major variable on which students will differ in ways important to understanding the development of Attitude Toward Life. Indeed, many large-scale studies have shown Socio-Economic Status to relate to a number of motivational and achievement variables (Bachman, 1970; Mayeske, 1972b; Husén, 1967; Shaycoft, 1967; Plowden, 1967; and Flanagan, 1964). It also seems likely that an important role may be played by the presence or absence of key family members. For example, father absence may play a greater role in boys' than in girls' attitudinal development. However, as we observed earlier, the group means for Socio-Economic Status and Family Structure

[10] The same 11 items and weights were used for the 9th and 12th grades. For the 6th grade, however, only 5 items were used. Two of these were different from those used at the higher grades; different weights were also used. Satisfactory sets of attitudinal items were not available at the lower grades.

[11] We used principal components analyses with varimax rotations of components having roots of 1 or greater.

[12] These are the within-racial-ethnic-group correlations.

Table 2.8.—Correlation of Attitude Toward Life With Family Background and Achievement, by Racial-Ethnic Group and Sex

Set of Variables	Indians			Mexicans			Puerto Ricans			Negroes		
	T	M	F	T	M	F	T	M	F	T	M	F
Socio-Economic Status (SES)	24	18	32	27	26	29	27	28	28	21	20	23
Family Structure and Stability (FSS)	21	18	24	20	20	21	18	18	17	18	18	17
Expectations for Excellence (EXPTN)	40	40	41	38	40	38	41	43	39	47	50	43
Educational Plans and Desires (EDPLN)	38	39	37	37	39	36	43	44	45	45	45	43
Study Habits (HBTS)	45	42	48	43	41	45	45	48	41	43	44	39
Achievement (ACHV)	37	36	39	41	41	42	39	37	40	38	38	38
Multiple Correlation (MC)	54	52	57	55	54	56	56	57	56	58	59	57

Set of Variables	Orientals			Whites			Total (U)			Total (A)		
	T	M	F	T	M	F	T	M	F	T	M	F
Socio-Economic Status (SES)	27	26	31	27	27	28	33	32	34	25	25	26
Family Structure and Stability (FSS)	34	39	26	18	20	14	25	26	23	18	19	16
Expectations for Excellence (EXPTN)	47	50	42	40	42	37	43	45	40	41	44	39
Educational Plans and Desires (EDPLN)	48	52	41	40	42	40	42	44	39	40	42	39
Study Habits (HBTS)	45	45	45	40	41	36	44	45	42	41	42	38
Achievement (ACHV)	40	42	38	41	40	42	46	45	46	39	39	39
Multiple Correlation (MC)	57	61	56	53	54	52	58	58	57	54	54	53

NOTE.—MC=multiple correlation of all 6 row variables with ATTUD. Family Background consists of all the row variables except ACHV.

are highly correlated (see table 2.3, p. 12). Consequently, we will regard these two variables as indicators of the family's position in the social structure. We shall call these two variables, when taken together, the student's Home Background. When we put all students together and introduce Racial-Ethnic Group Membership into the analyses we shall treat it as an aspect of Home Background. This is because we have already found that there was a great deal of confounding of Racial-Ethnic Group Membership, Socio-Economic Status, and Family Structure and Stability (Mayeske et al., 1972b). We also found that Racial-Ethnic Group Membership behaved more like a social structural than an attitudinal variable. This is not too surprising when one considers that disproportionately greater numbers of minority group members are concentrated in the lower socioeconomic strata.

Finally, Expectations for Excellence, Study Habits, Educational Plans and Desires, and Achievement can all be thought of as *intervening* between the structural aspects of society represented by Home Background and the development of Attitude Toward Life. The first three of these variables are attitudinal and motivational in nature: they represent the various expectations and aspirations that parents and students have for the latter's schooling, as well as the activities that they both engage in to support these aspirations. Accordingly, as we have already stated, these three variables taken together have been labeled "Family Process." The other variable, Achievement, can be thought of as intervening between Home Background and Attitude Toward Life. In addition, Achievement can be thought of as existing in both a cause and an effect relationship with Family Process. This is only another way of saying that although knowledge of their child's achievement can cause parents to alter their expectations and aspirations for his schooling, these expectations and aspirations can serve to enhance his achievement too. Also, the child's Attitude Toward Life and Achievement can be thought of as reciprocally influencing one another over time. Because of these kinds of considerations we shall treat Achievement as a separate set.

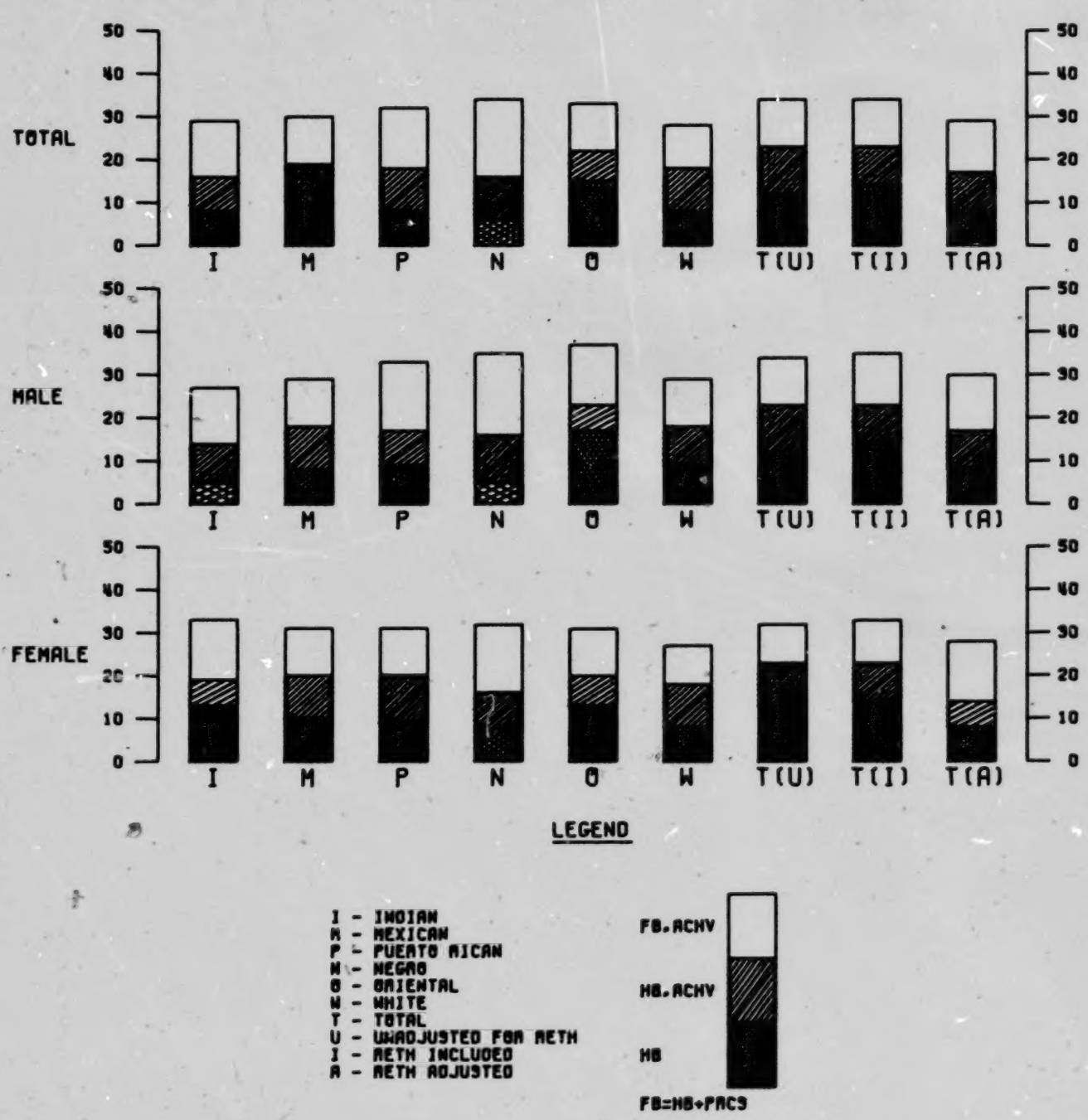
The three sets of variables, Home Background (HB), Family Process (PRCS), and Achievement (ACHV), can now be entered into a series of regression analyses with Attitude Toward Life as the dependent variable. Since it is plausible to think of the HB variables as tending to be first in a causal ordering, they will be entered first into the regression. Since there are no obvious criteria for second choice we shall decide it arbitrarily by entering Achievement second and Family Process last. Thus we obtain three kinds of squared multiple correlation: HB; HB, ACHV; and FB, ACHV. These values, called percentages of variation, are given for each racial-ethnic group by sex in figure 2.1. In addition, there are three types of analyses, labeled "T," involving all the students. These types vary according to the status of Racial-Ethnic Group Membership (RETH). For the "U" type, RETH is excluded from the analyses, that is, ATTUD is unadjusted for RETH. For the "I" type, RETH is included in the HB set. For the "A" type, ATTUD is first adjusted for RETH by means of partial correlation techniques, and then regression analyses are conducted on the adjusted scores.[13]

As an example of some of these analyses let us observe the results for Indians in figure 2.1. It will be seen from the upper left portion of this figure that 8 percent of the variation in ATTUD (the crosshatched areas) can be accounted for by the HB variables of SES and FSS. When ACHV is entered into the regression with HB this percentage increases to 16 (the slanted and crosshatched areas together). When PRCS is also entered the percentage increases to 29 (the plain, slanted, and crosshatched areas combined).

Figure 2.1 also shows that each of the three sets substantially increases the percentage of variation accounted for. Slightly greater variability in these percentages is evidenced for the HB analyses than for the others. Most of this is due to the Oriental-American group. When all three sets are entered into the analyses the smallest percentages are observed for whites and Indian Americans, and the largest for Negroes and Puerto Ricans. Sex differences cause some variations: Indian and Mexican-American females show larger percentages than the males of their respective groups. For the other groups males have larger percentages than females. For the "T" analyses the percentages tend to be largest of all for the "U" and "I" types, whereas for the "A" type they tend to be among the smallest, because of the

[13] These are the within-racial-ethnic-group analyses.

FIGURE 2.1. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND AND ACHIEVEMENT



substantial effect obtained by first eliminating RETH. In general, we may note that about one-third of the total differences among students in their Attitude Toward Life can be explained by a combination of Achievement and these family background factors.[14]

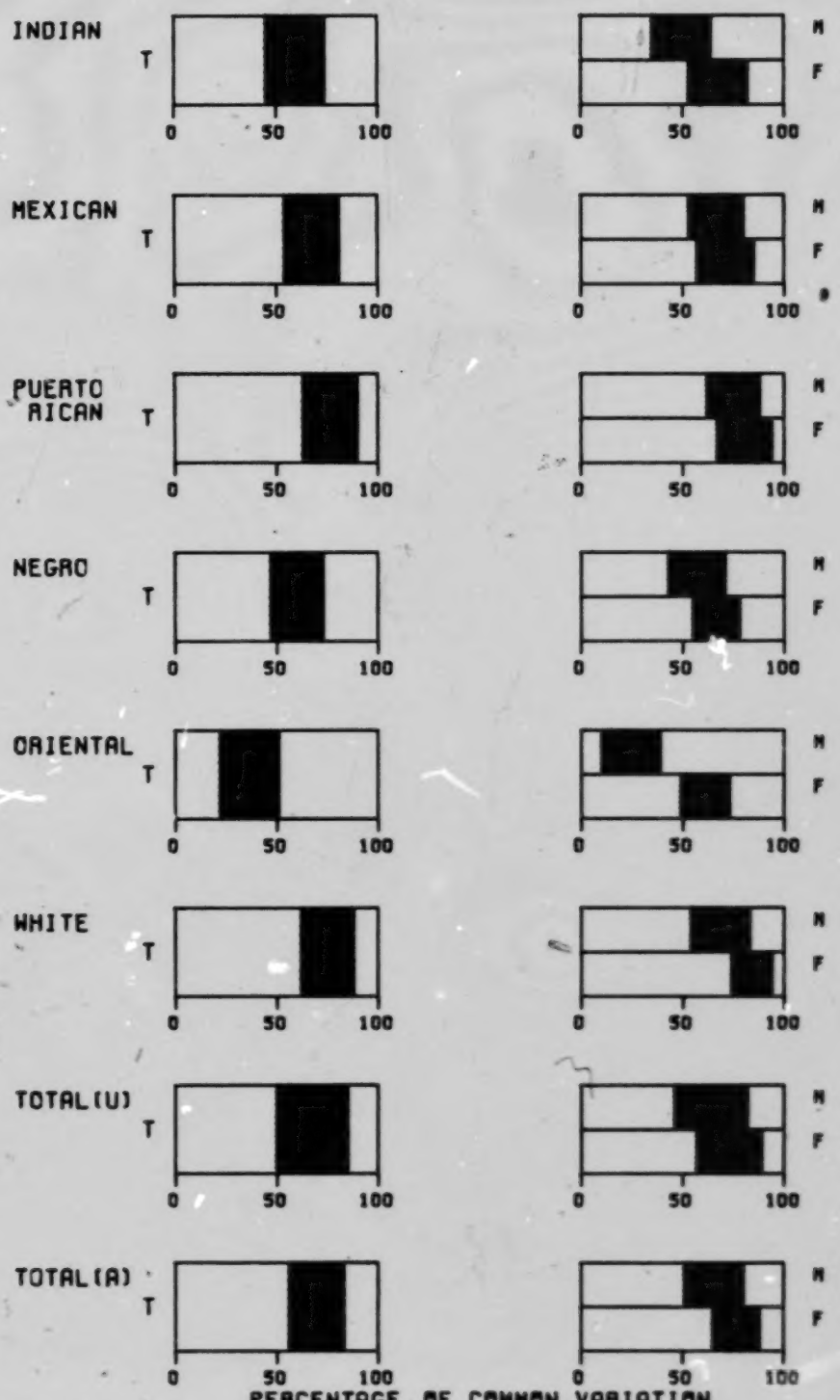
At this point the reader may ask: What would the results have been if these sets had been entered in a different order? For instance, the family process set could have been entered first, and then the other sets. The reader may also wonder which variables within each set are playing the greatest roles. The remainder of this chapter will be devoted to these questions.

2.3. HOME BACKGROUND AND ATTITUDE TOWARD LIFE

We observed in the previous section that Socio-Economic Status and Family Structure and Stability were closely related for all six racial-ethnic groups. We also observed that for each individual group as well as for all students combined, Socio-

[14] This figure is taken from the "T(I)" analyses.

FIGURE 2.2. - COMMONALITY ANALYSES OF SOCIO-ECONOMIC STATUS AND FAMILY STRUCTURE AND STABILITY WITH ATTITUDE TOWARD LIFE



Economic Status had a larger correlation with Attitude Toward Life than did Family Structure and Stability. We therefore wondered to what extent the possible effects of Family Structure and Stability might be disentangled from those of Socio-Economic Status. Was the role of Family Structure and Stability that was independent of Socio-Economic Status greater for some groups than for others? Or were the two sets so intertwined even for individual students that when the possible effects of one were taken into account so too were the possible effects of the other?

At first sight, the question might seem one that could be settled by regression analysis. But whereas in the usual regression analysis it is possible to ascertain the magnitude of the role played by one variable after a number of others have been taken into account, for this question we needed to know not only the variables' unique roles but their common roles as well. In order to do this we used our commonality technique, outlined in the appendix, as follows.

The percentage of variation in Attitude Toward Life (ATTUD) that can be uniquely associated with Socio-Economic Status (SES) or Family Structure and Stability (FSS) is given by the following equations, where U( ) designates the unique role of the variable in the parentheses, and R^2( ) the squared correlation with ATTUD of the variable or variables in parentheses.

$$U(SES) = R^2(SES, FSS) - R^2(FSS) \quad (1)$$

$$U(FSS) = R^2(SES, FSS) - R^2(SES) \quad (2)$$

Then their common portion, C, is given by:

$$C(SES, FSS) = R^2(SES, FSS) - U(SES) - U(FSS) \quad (3)$$

Given these three values, R^2(SES, FSS) can be expressed as their sum in the following manner:

$$R^2(SES, FSS) = C(SES, FSS) + U(SES) + U(FSS) \quad (4)$$

It will be seen that the R^2(SES, FSS) values are the same as those given for Home Background in figure 2.2. In order to render these values comparable across groups each term in equation 4 can be divided by R^2(SES, FSS), with the result that the terms sum to 100 percent and the relative roles of the variables are made comparable across groups. We have called this a "unitizing" operation and the resulting coefficients have been called "unitized commonality coefficients." The unitized commonalities for SES and FSS are shown graphically in figure 2.2.

Figure 2.2 shows the unique and common roles played by SES and FSS for each racial-ethnic group, by sex. It also shows the same values for when all students are combined ("Total"), and for when they are combined after ATTUD is first adjusted for differences in RETH ("Total (A)"). We will interpret these common portions as representing a confounding (i.e., without any functional relation) and possible interplay of SES and FSS as they relate to ATTUD. Figure 2.2 also shows that in almost every case the role of SES substantially outweighs that of FSS, and that the common portion (i.e., the crosshatched area) usually equals or exceeds that of the unique portion for FSS. The major exception is for Oriental-Americans, for whom FSS has the largest role. The extent to which the unique role of SES exceeds that of FSS is greatest for Puerto Ricans and whites, and lowest for Indian Americans and Negroes.[15] When all students are combined the role of SES is usually smaller than it is for the separate groups and that of the common portion larger (see "Total (U)"). However, when ATTUD is adjusted for RETH the role of SES becomes slightly larger and that of their common role and the unique role for FSS becomes smaller (see "Total (A)").[16]

Within each racial-ethnic group there are some notable variations by sex. For each group and every type of analysis the unique role of FSS is larger and that of SES smaller for males than for females. In several instances these differences are quite pronounced—for example, for Orientals and Indians with regard to FSS, and for Indians, Negroes, Orientals, and whites with regard to SES. This also tends to be the case when all students are combined (see "Total (U)"), though less so after adjustment has been made for RETH (see "Total (A)"). From these results we may infer that, except for Oriental-Americans, the role of SES exceeds that of FSS to a substantial degree, but that males show a greater sensitivity to FSS while females show a greater sensitivity to SES. For Oriental-Americans the latter also holds, although the role of SES exceeds that of FSS for females but not for males. In addition, a substantial portion of ATTUD explained by SES and FSS is shared by them both (i.e., they are inextricably intertwined).

We can now proceed to the role played by the Home Background factors when placed in context with Achievement and Family Process.

2.4. FAMILY BACKGROUND, ACHIEVEMENT, AND ATTITUDE TOWARD LIFE

We saw in the previous section that, to a considerable extent, the possible effects of Family Structure and Stability on Attitude Toward Life were intertwined with those of Socio-Economic Status. But what of the confounding of Home Background, Achievement, and Family Process? In order to examine this we would need to perform a three-set commonality analysis, as described in the appendix, and then compare these results for the different groups. However, the results from a three-set commonality analysis yield three unique values and four meas-

Table 2.9.—Percentage of Variation in Attitude Toward Life Accounted for by Family Process Measures, by Racial-Ethnic Group and Sex

Sex	Indian	Mexican	Puerto Rican	Negro	Oriental	White	Total (U)	Total (I)	Total (A)
Total									
D_1	4	5	4	4	2	3	6	6	3
D_2	86	83	88	88	94	89	82	82	90
Male									
D_1	4	4	3	3	4	3	5	6	3
D_2	85	86	91	91	89	90	85	83	90
Female									
D_1	5	6	6	5	4	4	6	7	4
D_2	85	81	81	84	87	85	81	79	86

[15] Except again for Oriental-Americans, of whom the reverse is true.

[16] The "Total (I)" analysis is not conducted here, since RETH is not directly classifiable as either one of these factors.

ures of confounding.[17] Clearly, for 27 groups these three-set analyses would require far too many comparisons.[18] Fortunately, there is a simplifying strategy that will allow us to reduce the number of comparisons considerably. The rationale for this will, however, require some elaboration.

As we have explained in the appendix, the results from a three-set commonality analysis allow us to express the squared multiple correlation for each set with the dependent variable—in this case, Attitude Toward Life—as a function of its different orders of commonality. For our three-set case these would be:

$$R^2(HB) = C(HB, ACHV, PRCS) + C(HB, ACHV) + C(HB, PRCS) + U(HB) \quad (1)$$

$$R^2(ACHV) = C(HB, ACHV, PRCS) + C(ACHV, HB) + C(ACHV, PRCS) + U(ACHV) \quad (2)$$

$$R^2(PRCS) = C(HB, ACHV, PRCS) + C(PRCS, HB) + C(PRCS, ACHV) + U(PRCS) \quad (3)$$

Now if one of these sets should happen to capture most of the variation in ATTUD explained by all three sets together, then we could focus on the results for that set only, thus greatly reducing the number of comparisons to be made. We decided whether or not this was the case by comparing the value of R^2 for each individual set with the value of R^2 for all three sets. When we made these comparisons we noted that the R^2 for PRCS was always close to the value obtained for the three-set value. In order to display this in a systematic manner we have presented two sets of computations in table 2.9. The first row, labeled D_1, presents the following:

$$D_1 = R^2(HB, ACHV, PRCS) - R^2(PRCS) \quad (4)$$

The second row, labeled D_2, presents the following:

$$D_2 = \frac{R^2(PRCS)}{R^2(HB, ACHV, PRCS)} \quad (5)$$

where D_1 indicates the percentage of total variance in ATTUD explained by HB and ACHV that is independent of PRCS.[19] Table 2.9 shows that the percentage of total variation in ATTUD that is independent of PRCS is usually small, ranging from 2 percent for Oriental-Americans to near 7 percent for the "Total (I)" type of analysis. This means that if we focus on the commonality results for R^2(PRCS) alone, we will be overlooking only about 7 percent, at most, of the variance explained by these three sets.

The ratio given by D_2 shows the percentage of the variation explained by all three sets that is explained by the PRCS set. These percentages show that the proportion captured by the PRCS set is very high, usually above 80 percent and sometimes above 90 percent. We may also note that these values are greater for males than for females. This indicates that of the *explained* variance for the three sets, PRCS accounts for a greater share in the case of males than of females. In other words, boys—independently of their Home Background and Achievement—are more sensitive to Family Process than are girls. These combined results suggest that if we focus only on the results for Family Process we will not overlook much. Before we go on, however, we should ask which one of the sets, HB or ACHV, accounts for the percentage that will be overlooked. The results of commonality analyses (not reported here) showed that it was ACHV.

The next question we faced was: What are the unique and common roles played by Family Process in Attitude Toward Life? By "common" we mean the percentage that Family Process (PRCS) shares with either Home Background (HB), Achievement (ACHV), or both. In order to render these values comparable across groups we divided equation (3) by R^2(PRCS), so that the results for each group summed to 100 percent. The values so obtained are given in graphic form in figure 2.3.

Before we proceed with a discussion of these results a word about their presentation may be in order. Let us consider equation (3) after it has been divided by R^2(PRCS):

$$100 = \underset{(1)}{C(PRCS, ACHV, HB)} + \underset{(2)}{C(PRCS, ACHV)} + \underset{(3)}{C(PRCS, HB)} + \underset{(4)}{U(PRCS)}$$

In figure 2.3 the plain portions correspond to (1), the slanted lines from upper left to lower right to (2), the slanted lines from upper right to lower left to (3), and the crosshatched areas to (4).

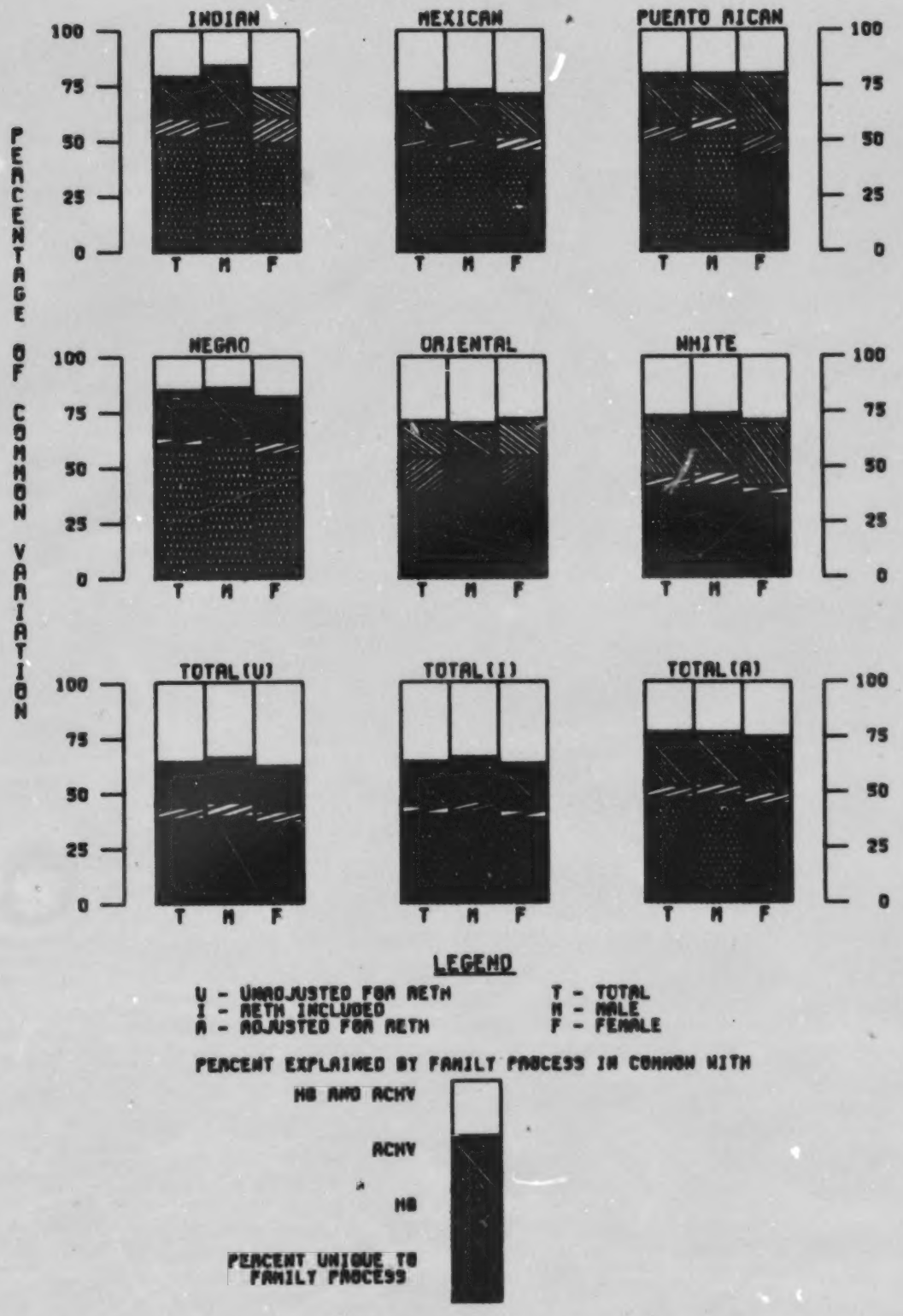
Figure 2.3 shows that, for every group, the unique value for Family Process (PRCS)—i.e., the crosshatched area—is almost always greater than any of the higher order coefficients. These results, along with those discussed in table 2.9 (p. 18), indicate that the set of Family Process factors plays the greatest role in Attitude Toward Life (ATTUD). However, there is a substantial confounding of these three sets with one another in the way they relate to Attitude Toward Life. This can be seen from the magnitude of the higher order commonalities, particularly the dotted and right-slanted areas. In examining these areas more closely for each racial-ethnic group we can note that, except for Oriental-Americans, the dotted and right-slanted areas are usually 2 to 4 times larger than those for the left-slanted areas. These results indicate that the confounding and possible interplay of PRCS is greatest for its combination with Achievement (ACHV) and its three-way combination with Achievement and Home Background. Of these latter, the values of the three-way combination tend to equal or exceed those of its combination with Achievement, except for Puerto Ricans and Negroes. The latter results tend also to hold for Oriental-Americans, except that the combination of Family Process with Home Background is greater for them. These results show that although Family Process has a large unique role in Attitude Toward Life, there is still a considerable portion of Family Process in Attitude Toward Life that is involved with the student's Achievement and Home Background combined. Still another portion is involved with his Achievement. To the extent that such results, together with those from table 2.9, represent a mutual interplay of these three sets, they indicate that Home Background and Achievement have very small effects on Attitude Toward Life that are independent of Family Process. What effects these sets do have can be thought of as operating in common with Family Process. There are also some noticeable variations by sex. Thus, for females more of the possible effects of Family Process on Attitude

[17] Three for the 2-way combinations and 1 for the 3-way combination.

[18] That is, for 9 racial-ethnic and total groups multiplied by 3 breakdowns (into male, female, and total).

[19] This difference can be regarded as the unique role for the combined set of HB and ACHV.

FIGURE 2.3. - THE UNIQUE AND COMMON ROLES OF FAMILY PROCESS MEASURES IN ATTITUDE TOWARD LIFE



Toward Life are confounded with different combinations of Home Background and Achievement than is the case for males.

In following a logical sequence it seems only natural to inquire as to which aspects of the family process set play the greatest role in Attitude Toward Life. This is taken up in the next section.

2.5. THE INDEPENDENT ROLE OF FAMILY PROCESS FACTORS IN ATTITUDE TOWARD LIFE

We saw in the previous section that the set of variables we have called Family Process plays a large role in Attitude Toward Life, independently of Home Background and Achievement. We may inquire then as to which aspects of the family process set play the greatest independent role.

It will be recalled that the three variables of which Family Process is made up are Educational Plans and Desires (EDPLN), Expectations for Excellence (EXPTN), and Study Habits (HBTS).[20] We divided these three variables into two sets. The first consisted of EDPLN and was taken to represent the student's longer range motivations. The second consisted of EXPTN and HBTS, and was taken to represent the student's more immediate motivations. This latter set was called Other Motivational Measures (OTHER). Commonality analyses were run with these two sets of variables after adjustments had first been made in Attitude Toward Life for Home Background and Achievement by means of partial correlation techniques. Returning to figure 2.3 (p. 20) we can see that the portions of Family Process in Attitude Toward Life that are independent of Home Background and Achievement are represented by the double-crosshatched areas only. The values for these areas represent a substantial portion of the variance in Attitude Toward Life explained by these three sets.[21]

Unitized commonality analyses for these two sets of variables are given in graphic form in figure 2.4. Here, it will be seen that for each separate group, as well as for the "Total" analyses, both before and after adjustments are made for Racial-Ethnic Group Membership, the role of Other Motivational Measures in Attitude Toward Life far outweighs that of Educational Plans and Desires. The common portions indicate that to the extent that Educational Plans and Desires play a role in Attitude Toward Life, most of this role is confounded with the other motivational measures. Some variations by sex are apparent, but they do not consistently favor one group over the other. Thus the set called "Other" has a greater role in Attitude Toward Life for female than for male Indian Americans, Mexican-Americans, and Oriental-Americans, while for the other groups this role is greater for males than for females. The role of Educational Plans and Desires tends also to be somewhat greater for male Puerto Ricans, Negroes, and whites than for the females of each group. Such differences by sex become much less pronounced when all students are combined, both before and after adjustment is made for Racial-Ethnic Group Membership.

These results suggest that it is the more immediate kinds of student and parent involvement rather than their longer range plans that make a difference in their outlook on life. In the next chapter we see how the stability of the results obtained in this chapter holds up for different regions of the country.

[20] For more details on these variables, see pp. 4–5.

[21] These values are obtained by subtracting the value for the shaded areas (both crosshatched and slanted lines) from that for all 3 areas.

2.6. THE SEPARATE ROLES OF HOME BACKGROUND, FAMILY PROCESS MEASURES, AND ACHIEVEMENT IN ATTITUDE TOWARD LIFE

In order to gain an even better understanding of how different aspects of the student's family background relate to his Attitude Toward Life when placed in context with other variables, we shall conduct, for all students combined, some three- and four-set commonality analyses. We shall not conduct them for the separate racial-ethnic groups by sex because the results of such an analysis would be far too numerous to manage.

In the previous sections we saw how Home Background and Family Process relate to Attitude Toward Life for each of the separate racial-ethnic groups, by sex. In addition, we studied how these sets relate to Attitude Toward Life for all students, when Racial-Ethnic Group Membership was and was not included as an aspect of Home Background. However, this does not tell us how each of these separate Home Background variables relates to Attitude Toward Life when placed in context with the Family Process set. Accordingly, our first question in this section is: What are the magnitudes of the relative roles played in Attitude Toward Life by each of the three home background variables of Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership when placed in context with the set of three family process measures?

The answer to this question, in the form of a four-set commonality analysis, is given in table 2.10.[22] These results are organized in a somewhat different manner than heretofore and hence require special comment. The commonality coefficients have been unitized by dividing each one by the total squared multiple correlation (R-SQ(T)) of 36. Hence, 36 percent of the total differences among students in their Attitude Toward Life can be explained by these four sets of variables. The rows labeled "SUM %" give the percentage of explained variation that can be accounted for by the variable or set of variables in that column. For example, 40 percent of the explained variance in Attitude Toward Life can be accounted for by Socio-Economic Status, and this value is obtained by summing the coefficients in that column. Moreover, all of this 40 percent is confounded with the other three sets, as is evidenced by the zero unique value, $U(X_1)$ for SES. Most of the confounding for Socio-Economic Status occurs at the second order with Family Process (12 percent), with Family Structure and Stability and Family Process (10 percent) at the third order, and with Racial-Ethnic Group Membership and Family Process (5 percent). Another 11 percent is inseparably intertwined with the other three sets. In a similar manner, of the 30 percent of Attitude Toward Life that is explained by Family Structure and Stability, 6 percent is in common with Family Process, 10 percent with Socio-Economic Status and Family Process, and 11 percent with the other three sets. Of these four sets of variables Racial-Ethnic Group Membership has the second largest unique value but the smallest percentage sum. However, this unique value of 6 percent for Racial-Ethnic Group Membership is almost 8 times less than the unique value for Family Process. The remaining 19 percent of Racial-Ethnic Group Membership is confounded with the other sets. Most of this occurs in its two-way combination with Socio-Economic Status (12 percent) and

[22] These analyses use the full number of 133,136 9th-grade students as indicated in table 2.4 (p. 12). An exposition of the 4-set commonality analyses will be found in the Technical Supplement.

FIGURE 2.4. - COMMONALITY ANALYSES OF EDUCATIONAL PLANS AND OTHER MOTIVATIONAL MEASURES WITH ATTITUDE TOWARD LIFE

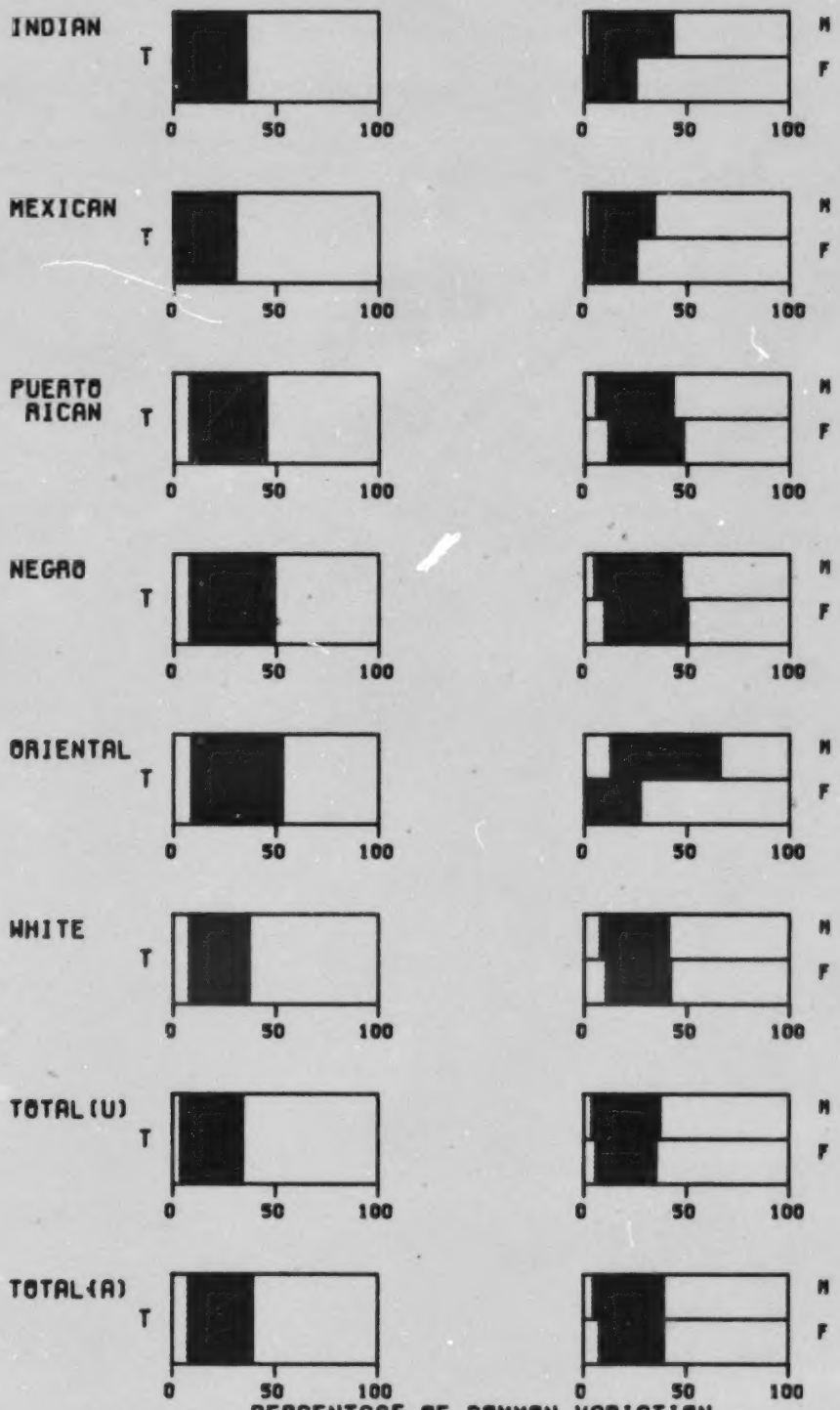


Table 2.10.—Commonality Analyses of 3 Home Background and Family Process Measures With Attitude Toward Life

	1 SES	2 FSS	3 RETH	4 PRCS
U (Xi)	0	0	6	46
C(X1X2)	0	0	---	---
C(X1X3)	1	---	1	---
C(X1X4)	12	---	---	12
C(X2X3)	---	0	0	---
C(X2X4)	---	6	---	6
C(X3X4)	---	---	−1	−1
C(X1X2X3)	1	1	1	1
C(X1X2X4)	10	10	---	10
C(X1X3X4)	5	---	5	5
C(X2X3X4)	---	2	2	2
C(X1X2X3X4)	11	11	11	11
SUM %	40	30	25	92
R-SQ(T)		36		

NOTE.—Number of 9th-grade students = 133,136.

Family Structure and Stability (6 percent); a lesser role is played by its three-way combinations with Socio-Economic Status and Family Structure and Stability (10 percent) and with Socio-Economic Status and Racial-Ethnic Group Membership (5 percent). However, the percentage of Racial-Ethnic Group Membership that is confounded with the other three sets is one of the largest of all (11 percent).

These analyses have shown that when the three Home Background measures of Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership are placed in context with the set of Family Process Measures as they relate to Attitude Toward Life, the roles of Socio-Economic Status and Family Structure and Stability are completely confounded. Most of this occurs either in their two-way combination (X1X4 or X2X4) or in their three-way combination (X1X2X4) with Family Process, and to some extent in their four-way combination (X1X2X3X4). Racial-Ethnic Group Membership had the second largest unique value, but this was 8 times smaller than that of Family Process. This unique value of 6 percent for Racial-Ethnic Group Membership may represent the motivational aspects of such membership—aspects that are unrelated to the other kinds of variables. Of the variance in Racial-Ethnic Group Membership that was confounded, most occurred for its three-way combination with Socio-Economic Status and Family Process (X1X3X4), and for its combination with all the other sets. However, almost all of the explained variance in Attitude Toward Life can be accounted for by the set of Family Process measures. Of the half of the explained variance that is confounded with the other sets, most occurs with Socio-Economic Status and Family Structure and Stability.

Our next task was to discover how these relationships might change when Achievement was entered into the analysis. We therefore asked: What is the magnitude of the relative roles played in Attitude Toward Life (ATTUD) by the set of Home Background measures? In order to show the role played by Racial-Ethnic Group Membership (RETH) in these analyses, we defined Home Background (HB) in two ways. In the first way, Home Background included Socio-Economic Status (SES) and Family Structure and Stability (FSS). In the second, the set of HB measures included RETH as well as SES and FSS. This latter way was labeled "HB(I)," to show that RETH had been included as an aspect of HB. The results of the three-set commonality analyses involving these sets of variables are given in table 2.11, which shows that the inclusion of RETH adds very little by way of explanation. This can be seen from the magnitudes of the squared multiple correlations, R-SQ(T), which differ by only 1 percent. Hence, about 39 percent of the differences among students in ATTUD can be explained by these sets of variables. When the squared multiple correlations are divided out, we can see that the effect of including RETH as an aspect of HB is to increase the unique value of HB and its portion in common with ACHV, C(X1X2), on the one hand, and to decrease its common portion with PRCS, C(X1X3), and with both PRCS and ACHV, C(X1X2X3), on the other. The inclusion of RETH also tends to reduce the unique value for ACHV and to increase its confounding with HB. However, it has very little effect on PRCS.

Finally, we can see from the row labeled "SUM %" that the set of PRCS measures accounts for about 86 percent of the explained variation, while ACHV accounts for 57 percent and HB for 50 percent. The magnitude of the unique values also follows this ordering: that for PRCS is about 4 times greater than that for ACHV and 16 times greater than that for HB(I). The extent to which each variable is confounded with the others also follows this ordering, with the percentages confounded being: PRCS, 54; ACHV, 50; and HB, 48. For each of the three sets most of this confounding occurs in their relationship with one another, C(X1X2X3). About equal proportions of PRCS are confounded with HB and with ACHV (C(X1X3) and C(X2X3)), whereas more of ACHV is confounded with PRCS than with HB (C(X2X3) as opposed to C(X1X2)). Similarly, more of HB is confounded with PRCS than with ACHV (C(X1X3) as opposed to C(X1X2)). Hence, the set of three PRCS measures, when put in context with HB and ACHV, still plays a large common and unique role in explaining differences among students in ATTUD.

The previous analyses have shown that Family Process figures importantly in the explanation of Attitude Toward Life. It seems only natural, then, to inquire as to which aspects of the family process set may be playing the greatest role. In section 2.5, in order to reduce the number of comparisons, we divided the set of three Family Process measures into two subsets. In this section, however, because we are dealing with all the students at once, we shall keep each variable separate and study the manner in which it relates to Attitude Toward Life. Accordingly, our question is: What are the magnitudes of the relative roles played by each of three Family Process measures in Attitude Toward Life? Since these magnitudes may vary according to which other variables have been taken into account, we shall conduct these analyses both before and after Attitude

Table 2.11.—Commonality Analyses of Home Background, Achievement, and Family Process With Attitude Toward Life

	1 HB	1 HB (I)	2 ACHV		3 PRCS	
U(Xi)	0	2	11	7	31	32
C(X1X2)	2	6	2	6	---	---
C(X1X3)	11	10	---	---	11	10
C(X2X3)	---	---	12	12	12	12
C(X1X2X3)	33	32	33	32	33	32
SUM %	46	50	58	57	87	86
R-SQ(T)	---	---	38	39	---	---

NOTE.—Number of 9th-grade students = 133,136. HB consists of SES and FSS, while HB(I) designates HB with Racial-Ethnic Group Membership included.

Table 2.12.—Commonality Analyses of the 3 Family Process Measures With Attitude Toward Life, When Adjusted for Different Aspects of Home Background and Achievement

	Educational Plans 1				Expectations 2				Study Habits 3			
	U	HB	HB (I)	HB (I) ACHV	U	HB	HB (I)	HB (I) ACHV	U	HB	HB (I)	HB (I) ACHV
U(Xi)	7	8	10	5	8	15	15	16	16	22	20	29
C(X1X2)	9	11	12	7	9	11	12	7	---	---	---	---
C(X1X3)	9	7	7	6	---	---	---	---	9	7	7	6
C(X2X3)	---	---	---	---	14	16	15	19	14	16	15	19
C(X1X2X3)	36	21	21	17	36	21	21	17	36	21	21	17
SUM %	61	47	50	35	67	63	63	59	75	66	63	71
R-SQ(T)	---	---	---	---	33	20	21	17	---	---	---	---

NOTE.—"U" designates ATTUD before any adjustments were made; "HB" adjustments in ATTUD for HB; "HB(I)" adjustments for HB including RETH; and "HB(I), ACHV," adjustments for both HB(I) and ACHV. Number of 9th-grade students=133,136.

Toward Life has been adjusted for a variety of background conditions. The results of these analyses are given in table 2.12, which gives the results of three-set commonality analyses for four different kinds of condition.

For the first kind of condition, labeled "U," Attitude Toward Life (ATTUD) is not adjusted for any other relationship. For the second kind, Home Background (HB), Attitude Toward Life is first adjusted for its relationship with Socio-Economic Status (SES) and Family Structure and Stability (FSS), after which three-set commonality analyses are run. For the third condition, the adjustments are made for Home Background including Racial-Ethnic Group Membership, designated HB(I), while for the fourth adjustments are made for both HB(I) and Achievement. In table 2.12, the results of these analyses have been organized under each family process variable, so that one can see the changes that occur in the coefficients as the adjustment conditions change. In order to render the results comparable across conditions the commonality coefficients were first unitized. It will be seen from the row labeled "R-SQ(T)" that these 3 variables explained 33 percent of the total differences among students in Attitude Toward Life. After adjustments were made for Home Background they accounted for 20 percent of the variation that remained; after adjustments were made for HB(I), they accounted for 21 percent; and after adjustments were made for HB(I) and ACHV, they accounted for 17 percent.

For each condition, it will be seen that after the R-SQ(T)'s have been divided out the largest role, both total (SUM %) and unique ($U(X_i)$), is for Study Habits (HBTS). Next largest is Expectations for Excellence (EXPTN), while the smallest is Educational Plans and Desires. For each adjustment we can also note a sizable confounding of the three variables with one another as they relate to ATTUD. Indeed, the magnitude of this third-order coefficient usually exceeds that of any of the lower order coefficients. At the second order, the largest commonalities occur for EXPTN and HBTS. These results are consistent with those in section 2.5, where we saw that when the two variables of EXPTN and HBTS were combined into a single set, their unique role in ATTUD far outweighed that of EDPLN, and they had a large common role. Because of those results as well as the ones observed here, we are inclined to attribute most of the explanatory power of Attitude Toward Life to Expectations for Excellence and Study Habits rather than to Educational Plans and Desires. This suggests that it is the immediate and personalized kinds of parent-child involvement that play a large role in the formation of Attitude Toward Life, both before and after Home Background and Achievement have been taken into account.[23]

2.7. SUMMARY

In this chapter the roles of Family Background (FB) and Achievement (ACHV) in Attitude Toward Life (ATTUD) were investigated for students of different racial-ethnic group membership, by sex. The manner in which these groups differed from one another on each of these variables was examined. We found that whites and Oriental-Americans ranked highest, and the other groups considerably lower.

We created a variable that indicated in which one of these groups a student had membership. This variable, called Racial-Ethnic Group Membership (RETH), was incorporated into our analyses of individual students as an aspect of FB. Correlates of RETH for each of the separate variables showed that these group differences were most pronounced for Socio-Economic Status (SES), Family Structure and Stability (FSS), and Achievement (ACHV). Although there were significant male-female differences in the correlation of one variable with another, the mean differences among the males and females of each racial-ethnic group were not of sufficient magnitude to warrant further investigation.

Whites displayed less diversity in Attitude Toward Life than did the other racial-ethnic groups; there was also less diversity among the females of each group than among the males. These differences impelled us to look for corresponding differences in Achievement and Family Background. We found that although there were some group differences in the way the separate variables were correlated with Attitude Toward Life, the correlations for Achievement, Expectations for Excellence (EXPTN), Educational Plans and Desires (EDPLN), and Study Habits (HBTS) were much higher than for Socio-Economic Status or for Family Structure and Stability. The multiple correlations of these 6 variables were moderately high and fairly similar in value, ranging from a high of 61 to a low of 52. Sex differences in these relationships were slight and were not uniformly greater for one group than for the other.

It also seemed reasonable to suppose that the presence or

[23] This is not to say that Home Background and Achievement do not figure importantly in Attitude Toward Life. In fact, as was shown in table 2.11, p. 23, together they explain about 6 percent of the total variance in Attitude Toward Life. This value was obtained by summing the commonality coefficients that involve only Home Background and Achievement.

absence of key family members would figure importantly in the development of Attitude Toward Life, and that family disruption in the form of father absence might have more detrimental effects for boys than for girls. Our prior analyses had shown that Socio-Economic Status (SES), Family Structure and Stability (FSS), and Racial-Ethnic Group Membership (RETH) were highly related, and that consequently their separate roles in Attitude Toward Life (ATTUD) might be difficult to disentangle. Accordingly, we used a technique called commonality analysis that allowed us to express the separable aspects of each variable in ATTUD as well as the way in which they were inseparably intertwined. The first question we posed in this way was: What are the relative roles played in Attitude Toward Life by Socio-Economic Status and Family Structure and Stability?

We found that for each group about one-fourth to one-third of the differences among students in Attitude Toward Life that could be explained by Socio-Economic Status and by Family Structure and Stability were inseparably intertwined among these two latter variables. The remaining portions, however, could be associated with either of them, and it is with these portions that we are chiefly concerned here. For the purposes of this summary, we shall divide the portion that could be uniquely associated with Socio-Economic Status by that uniquely associated with Family Structure and Stability. These ratios, listed in the following table, will be greater than 1 when the role of Socio-Economic Status exceeds that of Family Structure and Stability, equal to 1 when their roles are equal, and less than 1 when the role of Family Structure and Stability exceeds that of Socio-Economic Status.

SES/FSS

Group	Total	Male	Female
Indian	1.73	.97	2.94
Mexican	2.84	2.65	3.80
Puerto Rican	6.30	5.17	11.17
Negro	1.74	1.48	2.50
Oriental	.45	.16	1.80
White	5.17	3.18	12.33
Total (U)	3.33	2.56	5.18
Total (A)	3.29	2.55	5.42

The ratios show that in almost every case the unique role of Socio-Economic Status in Attitude Toward Life exceeds that of Family Structure and Stability—usually to a substantial degree. The main exception is for Oriental-American males, for whom the unique role of Family Structure and Stability exceeds that of Socio-Economic Status. The "total" analyses show the results obtained when all students are combined without regard to Racial-Ethnic Group Membership ("Total (U)"), and when Attitude Toward Life is first adjusted for Racial-Ethnic Group Membership ("Total (A)"). In every instance the ratio for females is greater than for males, which indicates that males are more sensitive to FSS factors than are females. On the basis of these analyses, we concluded that the role of Socio-Economic Status exceeded that of Family Structure and Stability, often to a substantial extent. We also concluded that the role of Family Structure and Stability that is independent of Socio-Economic Status is small, although a sufficient portion is inseparably intertwined with Socio-Economic Status to be worth including in later analyses as a single set (called Home Background).

For the next analyses, we formed a set of variables called Family Process (PRCS) by grouping together the three variables of Expectations for Excellence (EXTPN), Educational Plans and Desires (EDPLN), and Study Habits (HBTS). This set was called Family Process (PRCS), because it referred to the expectations and aspirations that both parent and student had for the student's schooling and to the activities in which they engaged to support these aspirations. Analyses with Family Process showed that Home Background and Achievement contributed very little to the explanation of Attitude Toward Life after the portion accounted for by the family process set had been taken into consideration.[24] We were therefore able to use our commonality technique to delineate the unique role of Family Process in Attitude Toward Life, and the extent to which this role was shared with Home Background and Achievement. The question posed was: What are the unique and common roles played by Family Process in Attitude Toward Life? By "common" we mean the percentage that Family Process shared with either Home Background or Achievement, or with both. We found that some 40 to 60 percent of the differences among students in their Attitude Toward Life that could be explained by Family Process were uniquely attributable to it. These values were lowest for Oriental-Americans and whites, and highest for Negroes (see figure 2.3, p. 20). The percentage that Family Process shared with the other sets tended to be largest for its combination with Home Background and Achievement and next largest for its combination with Achievement. For Negroes and Puerto Ricans, however, the combination with Achievement was larger. There were also sex differences: for instance, the unique role of Family Process was greater for males than for females.

We next examined the roles played by different aspects of Family Process after differences in Attitude Toward Life associated with Home Background and Achievement had first been set aside.[25] For these analyses we separated Family Process into the longer range motivational factors represented by Educational Plans and Desires, and the shorter range ones represented by Expectations for Excellence and Study Habits (we called the latter Other Motivational Measures). The question asked was: What are the relative roles played by Educational Plans and Desires and by Other Motivational Measures in Attitude Toward Life, after considerations of differences attributable to Home Background and Achievement have been set aside? By way of summary, the unique role for Other Motivational Measures (OTHER) divided by that for Educational Plans and Desires (EDPLN) is shown in the following table:

OTHER/EDPLN[1]

Group	Total	Male	Female
Indian	32.50	19.00	75.00
Mexican	35.00	22.00	75.00
Puerto Rican	6.88	9.50	4.33
Negro	6.38	10.60	5.00
Oriental	5.22	2.62	36.50
White	7.88	7.38	5.27
Total (U)	16.50	15.75	10.83
Total (A)	7.63	12.00	7.63

[1] In every case, OTHER exceeds EDPLN to a substantial degree; if the roles were equal, the ratio would be 1.0.

[24] Achievement contributed much more than Home Background.
[25] Or adjusted for, by means of partial correlation techniques.

These ratios show that Other Motivational Measures plays not merely a greater but a far greater role than Educational Plans and Desires, which has a substantial portion in common with Other Motivational Measures but a very small unique role. Sex differences were also apparent; however, they did not consistently favor one group over the other, and they diminished after all students were combined, both before and after adjustments were made for Racial-Ethnic Group Membership. These results suggest that it is the more immediate kinds of student and parent involvement rather than their longer range plans that make a difference in the student's outlook on life.

We have seen in this chapter that: (1) except for Oriental-Americans, the role of Family Structure and Stability in Attitude Toward Life that is independent of Socio-Economic Status is quite small, most of its possible effects being confounded with Socio-Economic Status; (2) a set of variables called Home Background, comprised of Socio-Economic Status, Family Structure and Stability, and Achievement, made very little contribution to Attitude Toward Life after differences in Family Process had been taken into account; (3) of the variation explained by Family Process, about 40 to 60 percent was uniquely attributable to it, while the remaining variation was inseparable from the possible effects of Home Background and Achievement combined with Family Process, or from those of Achievement and Family Process combined;[25] (4) of those aspects of Family Process that played the greatest role in Attitude Toward Life after differences attributable to Home Background and Achievement had been set aside, the more immediate kinds of parent-child involvement once more played a far greater role than any longer range educational aspirations.

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[25] Of these the former tended to be greater than the latter.

3. Family, Achievement, and Attitude Toward Life: Geographic Variations

In the previous chapter we examined the roles of Achievement and Family Background from a national viewpoint. However, we did not allow for the possibility that the physical and social well-being of the various racial-ethnic groups, as well as their opportunities for employment and advancement, may differ for different parts of the country. Since these variations may in turn relate to an individual's outlook on life, we decided to treat them in a separate chapter. The four geographic groupings used were: nonmetropolitan North; metropolitan North; nonmetropolitan South; and metropolitan South.[1]

The main question addressed in this chapter is: How do the relative roles of Achievement and of the different Family Background variables with Attitude Toward Life differ for each of these geographic groupings? By Family Background we mean a set consisting of Socio-Economic Status, Family Structure and Stability, Expectations for Excellence, Study Habits, and Educational Plans and Desires. Socio-Economic Status and Family Structure and Stability together are called Home Background, while the remaining variables are called Family Process. Accordingly, our main question can be respecified as the following four questions:

1. How do the relative roles of Socio-Economic Status and Family Structure and Stability differ for each geographic locale?
2. How do the relative roles of Home Background, Achievement, and Family Process in Attitude Toward Life differ for these same locales?
3. What is the magnitude of the role played in Attitude Toward Life by Educational Plans and Desires and the other family process measures, after students have been equated for differences in their Home Background and Achievement?
4. How does average Attitude Toward Life differ from one locale to another?

We addressed these questions for each of the racial-ethnic groups and for differences between the sexes within each group. With so many groups there was an unusually large number of comparisons. Accordingly, the present chapter contains only summaries of these analyses; the complete analyses are given in the Technical Supplement.[2] A few words should be added about the way in which these summaries are organized. For every summary, a regional value is given for each racial-ethnic group and "total" analysis. For all groups except Oriental-Americans, the North-South, metropolitan-nonmetropolitan classification was used. A somewhat different classification was necessary for Oriental-Americans because they tend to be clustered on the east and west coasts.

In most of the following tables, a column labeled "Sex" shows the extent to which one sex outranked the other in a preponderance of the regions. This is designated either by M>F when males exceeded females or F>M when females exceeded males.[3] When the results favored neither sex, the entry "Region" was made.[4]

As in chapter 2, we used three types of "total" analyses. "Total (U)" signifies that all groups were combined in the same framework, "Total (I)" that Racial-Ethnic Group Membership was included as an aspect of Family Background, and "Total (A)" that Attitude Toward Life was adjusted for Racial-Ethnic Group Membership before the analyses were run.

It should also be noted that these geographic analyses used the ninth-grade data throughout. As we remarked in chapter 2 (p. 11), the 9th grade was selected because the indices were most reliably measured at the 9th and 12th grades, and most of the dropouts had not yet occurred at the 9th grade. The total number of students in each locale and the proportion of males (P_m) are given in table 3.1. on page 28.

3.1. GEOGRAPHIC VARIATIONS IN THE DEPENDENCE OF ATTITUDE TOWARD LIFE ON ACHIEVEMENT AND FAMILY BACKGROUND

Before we could take up our four main questions we had to make the regional and group results more comparable by eliminating differences in the extent to which Attitude Toward Life was explained by the various sets of variables. Such differences indicate the extent to which Attitude Toward Life is more fully explained by or more dependent upon these variables for some groups than for others. Thus we eliminated these differences because we were interested in the explanatory role of one set compared with that of another set.

The percentages of variation, or R-squares, explained by Achievement and the five Family Background variables for each geographic locale are summarized in table 3.2. It will be seen that this percentage is generally lower in the North, and that it tends to get progressively higher as one moves from the North to the South. For example, the values for Indians and Mexican-Americans show an increasing progression from the nonmetropolitan North to the metropolitan North through the nonmetropolitan South and the metropolitan South. For Puerto Ricans and Negroes, on the other hand, the highest values are in the nonmetropolitan South. The next highest values for Puerto Ricans occur in the metropolitan South, whereas for Negroes the metropolitan values, for both North and South, are equal. For whites, the progression is somewhat weaker: their values in the South are not only equal but hardly greater than those in the North. Unlike the other groups, whites in the

[1] The States included in these groupings are given in chapter 1 (p. 6).

[2] Available from the senior author at the U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

[3] For example when males exceeded females in 3 out of 4 regions this was depicted by M>F. For Orientals one group had to exceed the other in only 2 out of 3 regions.

[4] I.e., the sex differences depended upon the region under consideration.

Table 3.1.—Number of 9th-Grade Students and Percentage Male (P_m), by Racial-Ethnic Group Membership and Geographic Locale

Racial-Ethnic Group	North NONMET Number	North NONMET P_m	North MET Number	North MET P_m	South NONMET Number	South NONMET P_m	South MET Number	South MET P_m
Indian	960	51	811	56	893	52	213	55
Mexican	663	57	2,510	56	1,921	59	745	59
Puerto Rican	99	62	2,959	48	455	61	189	65
Negro	1,212	49	14,450	48	13,362	47	8,241	49
White	11,830	51	42,800	50	15,238	50	6,885	50
Total	15,015	52	64,857	50	31,929	50	16,307	51
	Mid-Atlantic				Far West			
Oriental			318	53	228	60	941	49

NOTE.—"Total" represents the sum of the groups for each geographic locale, including Orientals for that locale.

North show greater dependence in nonmetropolitan than in metropolitan areas. The "total" analyses reflect the general progression from North to South. Oriental-Americans, who have a different geographic dispersion, show a greater dependence in the Far West than in the Mid-Atlantic.

What generalizations can we make on the basis of these results? We know that the institution of caste is more pronounced in the South than in the North; perhaps this has something to do with the larger percentages for the nonwhite groups. Also, there may be other circumstances in the South that reinforce this trend. Later analyses, which show the roles played by different sets of variables, will give us greater insight into some of the possible influences.

We should not pass on to our next question without reviewing what table 3.2 has to tell us about the influence of sex differences. It will be seen from the column labeled "Sex" that male Negroes, whites, and Oriental-Americans show a greater dependence than the females of their own group in a preponderance of regions; this is also true of all groups combined (see the rows labeled "Total"). For Mexican-Americans and Puerto Ricans however, it is the females who show greater dependence. Sex differences for Indians depend upon region: in the North the males have larger percentages, but the opposite is true in the South. We should note, however, that for no group is the sex difference pronounced, being usually in the range of 2 to 6 percentage points.[1] The roles played by different variables in these results are taken up in the following sections.

Table 3.2.—Summary of Percentage of Variation in Attitude Toward Life Explained by Family Background and Achievement, by Geographic Locale, Sex, and Racial-Ethnic Group

Racial-Ethnic Group	North NON-MET	North MET	South NON-MET	South MET	Sex
Indian	27	30	31	38	*Region*
Mexican	23	27	32	38	F>M
Puerto Rican	27	31	48	33	F>M
Negro	22	35	37	35	M>F
White	29	27	30	30	M>F
Total(U)	30	33	36	35	M>F
Total(I)	30	34	37	36	M>F
Total(A)	28	28	31	32	M>F
	Mid-Atlantic NON-MET	Mid-Atlantic MET	Far West NON-MET	Far West MET	
Oriental	—	31	41	33	M>F

[1] See the Technical Supplement for further details.

3.2. GEOGRAPHIC VARIATIONS IN THE DEPENDENCE OF ATTITUDE TOWARD LIFE ON SOCIO-ECONOMIC STATUS AND FAMILY STRUCTURE AND STABILITY

If there are greater opportunities for advancement and self-betterment for some of these groups in some regions than in others, it would seem reasonable to assume that the structure of one's family might come to play a greater role in Attitude Toward Life (ATTUD) where these opportunities are present than where they are not. For example, in the case of Negroes we might speculate that in regions where the institution of caste is less pronounced, parent-child relationships may play a greater role in shaping one's outlook than where that institution precludes participation in different areas of life. Accordingly, we examined the relative roles played by Socio-Economic Status (SES) and Family Structure and Stability (FSS) to see if they changed systematically with each geographic locale.

A summary of the results of unitized commonality analyses of SES and FSS are given in table 3.3. In order to summarize these many analyses, table 3.3 presents ratios of U(SES), the unique role for SES, divided by U(FSS), the unique role for FSS. When this ratio is greater than 1 it indicates that the role of SES exceeds that of FSS—the more so, the larger the value. When the ratio is less than 1 it indicates that the role of FSS exceeds that of SES—the moreso, the smaller the value. It will be seen from table 3.3 that for every group in almost every locale, the role of SES exceeds that of FSS. The extent of this departure is greatest by far for whites. Notable exceptions occur for Puerto Ricans in the nonmetropolitan North and for

Table 3.3.—Summary of the Relative Roles of Socio-Economic Status and Family Structure in Attitude Toward Life, by Geographic Locale, Sex, and Racial-Ethnic Group Membership

Racial-Ethnic Group	North SES/FSS NON-MET	North SES/FSS MET	South SES/FSS NON-MET	South SES/FSS MET	Sex
Indian	2.5	2.4	4.3	1.9	*Region*
Mexican	1.6	3.8	3.8	1.1	*Region*
Puerto Rican	—[1]	24.3	1.6	5.3	F>M
Negro	6.3	1.3	2.4	3.4	F>M
White	4.8	7.2	7.0	2.6	F>M
Total(U)	4.8	3.8	4.2	2.7	F>M
Total(A)	4.4	4.0	4.1	2.5	F>M
	Mid-Atlantic NON-MET	Mid-Atlantic MET	Far West NON-MET	Far West MET	
Oriental	—[2]	18.5	.6	.4	M>F

[1] The value actually obtained was .01.
[2] Too few cases for inclusion here.

Oriental-Americans in the Far West. Indeed, for the latter group we are inclined to conclude that FSS plays a somewhat greater role in ATTUD than does SES.

The common portions also showed considerable regional variability, from a high of about 35 percent to a low of about 20 percent. These results are not summarized here.

It will be seen from the column labeled "Sex" that in most regions the role of SES exceeds that of FSS to a greater extent for female than for male Puerto Ricans, Negroes, and whites, as well as for all groups combined. For Oriental-Americans just the opposite is the case, while for Indians and Mexican-Americans the ratio is greater for females than for males in the North but not in the South, and for Indians the ratio is greater for females in the metropolitan North and nonmetropolitan South. Another way of saying this is that for most groups ATTUD is more sensitive to FSS, independently of SES, for boys than for girls. The major exception is for Oriental-Americans, among whom females show greater sensitivity than males.

On the basis of these analyses we are inclined to conclude that: (1) SES plays a much greater role in ATTUD than does FSS, except for Oriental-Americans for whom the reverse is true; (2) ATTUD shows a greater sensitivity to FSS for boys than for girls, with the same exception for Oriental-Americans. We were unable to discern a systematic relationship between the attributes of the region and the magnitude of the ratios examined.

3.3. GEOGRAPHIC VARIATIONS IN THE DEPENDENCE OF ATTITUDE TOWARD LIFE ON HOME BACKGROUND, ACHIEVEMENT, AND FAMILY PROCESS

We noted in the previous chapter that the set of variables called Family Process played a large role in Attitude Toward Life independently of Home Background and Achievement. In this chapter, however, we did not use all the variables that make up these sets; having introduced the geographic factor, we would have had too many separate groups to deal with. Instead, we used only two sets of variables. The first set consisted of the two Home Background variables of Socio-Economic Status and Family Structure and Stability, with the variable known as Achievement. We called this three-variable set HB-ACHV. The second set was Family Process (PRCS).[6] Our main interest in these analyses was in the extent to which the unique role of PRCS exceeded that of the set called HB-ACHV in each region. In other words, are the results we observed in chapter 2 stable phenomena or do they depend upon the region? We also wanted to know if there was a systematic relationship between the magnitude of the results and the attributes of the regions.

In order to summarize the results of the unitized commonalities we divided the unique role of PRCS by that for HB-ACHV. The ratio so produced is greater than 1 when the role of PRCS exceeds that of HB-ACHV, 1 when their relative roles are exactly equal, and less than 1 when the role of HB-ACHV exceeds that of PRCS. Before we look at these ratios however, we may ask about the magnitude of the portion for each group in each locale. To what extent do "high HB" families with "high ACHV" children tend to engage in the types of activity

[6] Consisting of Expectations for Excellence (EXPTN), Educational Plans and Desires (EDPLN), and Study Habits (HBTS).

Table 3.4.—Summary of the Relative Roles of Family Background and Achievement in Attitude Toward Life, by Geographic Locale, Sex, and Racial-Ethnic Group Membership

Racial-Ethnic Group	North PRCS/HB/ACHV NON-MET	North PRCS/HB/ACHV MET	South PRCS/HB/ACHV NON-MET	South PRCS/HB/ACHV MET	Sex
Indian	4.2	2.2	2.3	3.4	M>F
Mexican	1.7	2.7	2.7	1.7	M>F
Puerto Rican	4.6	2.1	5.7	10.6	M>F
Negro	1.9	5.0	4.9	5.4	M>F
White	2.4	2.8	1.9	6.7	M>F
Total(U)	2.0	2.1	1.6	3.0	M>F
Total (I)	2.0	1.9	1.6	2.7	M>F
Total(A)	2.4	4.0	3.5	6.1	M>F
	Mid-Atlantic NON-MET	Mid-Atlantic MET	Far West NON-MET	Far West MET	
Oriental	[1]	.8	6.4	1.5	M>F

[1] Too few cases for inclusion here.

of which Family Process is an indicator—and do they engage in them more than "low HB" families with "low ACHV" children? The answer is that there is a considerable tendency for "high HB" families to engage in such activities, as can be seen from the substantial common portions (usually from 35 to 55 percent). These results will be found in the Technical Supplement.

To return to the unique role of Family Process (PRCS), it will be seen from table 3.4 that for each group in almost every locale the role of family process factors in Attitude Toward Life exceeds that of our HB-ACHV set, often to a considerable extent. The only exception is that of Mid-Atlantic, metropolitan Orientals for whom the roles are more nearly equal but favor somewhat the HB-ACHV set. For the other groups, the role of Family Process tends to be greatest for Puerto Ricans, Indian Americans, Negroes, and the analyses labeled "Total (A)." Its role tends to be smallest for the "total (U)" and "total (I)" analyses. The latter results reflect in part the status of Racial-Ethnic Group Membership (RETH): when RETH is included as an aspect of HB the ratios are among the smallest, but when it is first explicitly omitted they are among the largest of all. However, the ratios do not readily yield any systematic regional relationships, except for Oriental-Americans. For these latter, the role of PRCS exceeds that of HB-ACHV to a greater extent in the Far West than in the Mid-Atlantic region. Curiously, in the Far West this tendency is more pronounced in nonmetropolitan than in metropolitan areas. It can be seen from the "sex" column that these ratios are uniformly greater for males than for females in a preponderance of the regions. Hence, Attitude Toward Life for males shows a much greater sensitivity to Family Process factors, relative to HB-ACHV, than it does for females.

In summary, these analyses have shown that for all groups in almost all locales the unique role of Family Process factors considerably exceeds those of Home Background and Achievement. However, we should not overlook the fact that these sets share from about one-third to a little over one-half of the variance. It is clear, then, that "high HB" families with high-achieving children are very much prone to engage in the kinds of activity that we have labeled Family Process. We have seen in addition that for boys Attitude Toward Life shows a greater sensitivity to Family Process than it does for girls.

3.4. GEOGRAPHIC VARIATIONS IN THE DEPENDENCE OF ATTITUDE TOWARD LIFE ON TWO ASPECTS OF FAMILY PROCESS, WITH HOME BACKGROUND AND ACHIEVEMENT CONTROLLED

Our main interest here was to see if the results observed in chapter 2 for the two Family Process variables called Educational Plans and Desires (EDPLN) and Other Motivational Measures (OTHER) were stable for different regions of the country. First, adjustments were made in Attitude Toward Life for Home Background and Achievement. Unitized commonality analyses of EDPLN and OTHER were then run. The common portions showed that about one-fourth to one-third of their explained variance was shared in common. This suggests that students and parents who score high on EDPLN are more prone to engage in the kinds of activity we have called OTHER—and vice versa. By far the larger role, however, belongs to OTHER, as can be seen from the ratios in table 3.5. This table shows that the role of OTHER often dramatically exceeds that of EDPLN, except for Mid-Atlantic Oriental-Americans. The sex differences, however, are not consistent: the ratios are greater for male than for female Indian Americans, Puerto Ricans, Negroes, and whites, but for female than for male Mexican- and Oriental-Americans. Sex differences for the "total" analyses appear to depend upon the region.

We are inclined to conclude, therefore, that of those factors related to Attitude Toward Life after considerations of Home Background and Achievement have been set aside, the set called Other Motivational Measures plays a much greater explanatory role than does Educational Plans and Desires. Since the former set contains the variables that pertain to the more immediate kinds of parent-child involvement, we are inclined to conclude that these variables play a greater role in Attitude Toward Life.

3.5. GEOGRAPHIC VARIATIONS IN ATTITUDE TOWARD LIFE

In studying the extent to which Attitude Toward Life (ATTUD) differs both across and within geographic locales for each racial-ethnic group and by sex, we are interested primarily in the consistency of the results observed in the previous chapter. For example: Do females tend on the average to score higher than males on Attitude Toward Life? In order to summarize these and other mean differences of interest, we computed three kinds of summary figures, called "sigma gaps" or "sigma lags"

Table 3.5.—Summary of the Relative Roles of Educational Plans and Other Motivational Measures in Attitude Toward Life, by Geographic Locale, Sex, and Racial-Ethnic Group Membership

Racial-Ethnic Group	North OTHER/EDPLN NON-MET	North MET	South NON-MET	South MET	Sex
Indian	15.0	67.0	79.0	75.0	M>F
Mexican	11.7	73.0	10.2	75.0	F>M
Peuto Rican	4.2	6.2	11.2	7.7	M>F
Negro	2.3	6.3	6.1	6.8	M>F
White	9.4	7.6	7.8	6.1	M>F
Total(U)	10.8	16.8	16.0	10.2	*Region*
Total(A)	9.3	12.8	10.2	8.6	*Region*
	Mid-Atlantic NON-MET	Mid-Atlantic MET	Far West NON-MET	Far West MET	
Oriental	—[1]	.5	8.5	1.1	F>M

[1] Too few cases for inclusion here.

Table 3.6.—Summary of Differences in Average Attitude Toward Life, by Geographic Locale, Sex, and Racial-Ethnic Group Membership

Racial-Ethnic Group	North NON-MET	North MET	South NON-MET	South MET	Sex	Region
Indian	.6	.6	.4	.4	.4 F>M	.2
Mexican	.3	.5	.6	.4	.3 F>M	.4
Puerto Rican	.6	.9	.9	1.0	.3 F>M	.6
Negro	.4	.6	.7	.6	.4 F>M	.4
White [1]	0	0	.1	.1	.2 F>M	.1
	Mid-Atlantic NON-MET	Mid-Atlantic MET	Far West NON-MET	Far West MET		
Oriental	—[3]	.2	.3	.3	.3 F>M	.1

[1] Since the algebraic sign is always negative for each group, it is not included in the table.
[2] The deviations for whites are taken from their highest mean value, which occurred in the North (the metropolitan and nonmetropolitan northern means were identical). The deviations for Orientals are taken from the northern value for whites.
[3] Too few cases for inclusion here.

because they involved deviations taken from a mean and expressed in terms of sigma, or standard deviation, units.[2] The three sigma gaps in question were:

1. *White-other within-region gap.*—This figure was computed by subtracting the mean of the nonwhite group from the mean of the white group within each region, and dividing the results by the standard deviation of the distribution of ATTUD for all students. For example, in table 3.6, the value of 0.6 for Indian Americans in the nonmetropolitan North was obtained by subtracting their mean of 46.14 from the corresponding regional mean of 51.76 for whites, dividing this difference by 10 (which is the standard deviation for all students), and then rounding to 1 decimal place. Since the algebraic sign is always negative for each group it is not included in the table.
2. *Maximum within-region sex gap.*—Within each region the difference between the means of the males and the females was obtained and was divided by the standard deviation of ATTUD for all students. The largest of these values for the different regional groups was then selected as the maximum sex gap for that racial-ethnic group. If the mean for females exceeded that for males in three or more of the geographic groups, this was indicated by the inequality F>M. These entries are given in the "sex" column of table 3.6.
3. *Maximum between-region gap.*—This figure was obtained by selecting the maximum differences between means across regional groups, dividing by 10, the sigma (or standard deviation) for all students, and rounding to 1 decimal place. This maximum difference might be between either males or females in different geographic locales, or between the entire group in one locale as compared with that in another. These values are given in the column labeled "Region" in table 3.6.

The white-other gap, as can be seen from both pairs of "North" and "South" columns in table 3.6, is greatest for Puerto Ricans. Negroes have the next largest gap, followed

[2] The actual means are given in the Technical Supplement.

closely by Indians and Mexican-Americans. Oriental-Americans have the smallest gap of all—smaller in the Mid-Atlantic region than in the Far West. Northern whites have the highest mean value, followed closely by southern whites. For all groups there does not appear to be a systematic regional progression in these values. Thus for Indians larger values occur in the North than in the South, whereas for Mexicans, Puerto Ricans, and Negroes the reverse tends to occur, although exceptions are not hard to find.

It will be seen from the "sex" column in table 3.6 that, for most regions, females have a consistently higher mean than males. This male-female difference (i.e., the within-region sex gap) is greatest for Indians and Negroes, being on the order of 0.4 of a standard deviation, and least for whites, with a difference of 0.2 of a standard deviation. The differences for the other groups are on the order of 0.3 of a standard deviation.

Finally, the column labeled "Region" in table 3.6 shows the largest mean difference between regions, in sigma units (i.e., the maximum between-region gap), for each racial-ethnic group. These differences are largest for Puerto Ricans (0.6 of a standard deviation), and next largest for Mexican-Americans and Negroes (0.4 of a standard deviation), who are followed by Indian Americans (0.2 of a standard deviation). The lowest values are for Oriental-Americans and whites (0.1 of a standard deviation). Clearly, then, there are fairly substantial regional differences for some of these groups; indeed, at times these differences approach the extent to which the same groups differ from whites.

3.6. SUMMARY

In this chapter we examined regional variations in the roles played by Achievement and Family Background factors in Attitude Toward Life, for the different racial-ethnic groups, by sex. We found that for groups other than Oriental-Americans the dependence of Attitude Toward Life on Family Background (FB) and Achievement (ACHV) is greater, or more fully explained, in the South than in the North. The chief exception was the dependence of Oriental-Americans, which was greater in the West than in the East (in the West it was greater in the nonmetropolitan than in the metropolitan areas). This was due partly to the fact that most Oriental-Americans live on either the east or the west coast.

The level of explanation of Attitude Toward Life was found to differ by sex across regions. Male Negroes, whites, and Oriental-Americans had larger values than female ones. Just the opposite was observed for Mexican-Americans and Puerto Ricans, whereas for Indians sex differences tended to depend on region. Sex differences were seldom large for any group. We conjectured that the greater dependence of Attitude Toward Life on Family Background and Achievement in the South than in the North, particularly for the case in which all students were combined in the same framework, might be related in part to the fact that the institution of caste as well as other stratification practices were more highly developed there; that is, as of 1965.

We next examined geographic variations in the relative roles played in Attitude Toward Life (ATTUD) by Family Structure and Stability (FSS) and Socio-Economic Status (SES). We found that, for a preponderance of the regions, SES played a much greater role in ATTUD than did FSS except for Oriental-Americans, for whom the reverse was true. Also for a preponderance of regions, ATTUD showed a greater sensitivity to FSS, independently of SES, for boys than for girls, except again for Oriental-Americans, for whom the reverse was true. We could find no systematic regional progression in these relationships.

We also examined geographic variations in Home Background (HB) and Achievement (ACHV) combined, when compared with the role of Family Process (PRCS). Substantial common portions were observed, which indicated that students with higher ACHV scores from the "higher HB" families also tended to be the ones who scored high on variables in the PRCS set. However, the values for the unique roles of these variables showed that, for all groups, the role of PRCS considerably outweighed that of HB and ACHV combined. In addition, ATTUD showed a greater sensitivity to PRCS factors, independently of HB and ACHV, for boys than for girls. However, we could find no systematic regional differences in these relationships.

The relative roles of Educational Plans and Desires (EDPLN) and the other Family Process variables, called Other Motivational Measures (OTHER), were analyzed for their consistency. Our analyses showed that after considerations of HB and ACHV in ATTUD had been set aside, the set called OTHER played a much greater explanatory role than did EDPLN. This was so for all racial-ethnic groups in a preponderance of the regions. However, sex differences were not consistent from one racial-ethnic group to another, nor were there any systematic regional relationships. Since OTHER contains the variables that pertain to the more immediate kinds of parent-child involvement, while EDPLN pertains to the longer range educational and occupational aspirations of parents and children, we are inclined to conclude that these latter kinds of involvement play a greater role in ATTUD.

Finally, in average scores on Attitude Toward Life, Indians lagged whites to a greater extent in the North than in the South, whereas for Mexicans, Puerto Ricans, and Negroes there was a slight tendency for this gap to be greater in the South than in the North. West-coast Orientals differed more from whites than did east-coast Orientals. Females in general had a consistently more optimistic outlook on life than did males. The maximum between-region gap was for Puerto Ricans (0.6 of a standard deviation), and the minimum one was for Oriental-Americans (0.2 of a standard deviation). At times, the regional differences for some of these groups approached but did not equal the extent to which they differed from whites.

4. Family Background, Achievement, and Attitude Toward Life at the Individual and School Levels

In this chapter and the next we shall examine the role of various school factors in the direction taken by Attitude Toward Life. We shall first develop in some detail the concepts of: (1) differences among students; (2) differences among schools; (3) differences among students within schools. All these concepts are of great importance to the study of school influences because they indicate the maximum extent to which the differences among individual students can be explained by differences in the characteristics of the schools they attend. In this way they help us to judge the extent to which the schools as they are currently constituted (that is, as of about 1965) may serve as a vehicle for improving the achievement and motivation of school-age children.

In general, we can think of the differences among students on an attribute such as Attitude Toward Life as being made up of two parts. The first part is the extent to which the attribute is associated with the different schools students attend. For example, some schools will have a higher average score on Attitude Toward Life (ATTUD) than other schools because they contain a greater proportion of students who believe they can influence their life through the avenue of education (a belief that is one component of ATTUD). This source of variation was labeled "DAS" for "differences among schools." The second part is the extent to which students within schools—that is, in the same school—differ from one another on an attribute. Returning to our example of Attitude Toward Life, we can recognize that in any school, regardless of the school's average score, some students will have higher scores—indicating a more optimistic outlook on life—than others. This source of variation was labeled "DWS" for "differences among students within schools." The sum of DAS and DWS gives the total differences among students, a quantity that was labeled "DAT."

The term "DAS" is of particular interest because it represents the extent to which a particular attribute, such as ATTUD, might be influenced by altering the characteristics of the schools. This term, as we will use it, is obtained by squaring the correlation between the individual student variable and the school mean counterpart.[1] If, for example, the correlation between individual student ATTUD and school mean ATTUD is 0.4, then 0.16, or 16 percent of the variance in individual student ATTUD, is the maximum amount that can be explained by differences among schools.[2] Since 1.00 is the maximum value that a correlation coefficient can assume, the amount that is left unexplained is 1.00−0.16, or 0.84. This latter amount is relegated to the term DWS (and to error).

We are now in a position to formulate the main questions that will be addressed in this chapter. They are:

1. To what extent are Attitude Toward Life, Achievement, and the various Family Background measures associated with the schools students attend?
2. How do the relative roles of Home Background, Family Process, and Achievement in Attitude Toward Life change at the individual and aggregate (i.e., school) level?[3]
3. How do the results for (2) change when Racial-Ethnic Group Membership is introduced into the analysis?

4.1. PERCENT OF VARIATION IN INDIVIDUAL STUDENT MEASURES ASSOCIATED WITH THE SCHOOLS STUDENTS ATTEND

Table 4.1 shows the values of DAS for selected student measures at the ninth-grade level. These figures indicate the extent to which students who are similar with regard to each attribute go to school with one another. We can see from this table that the greatest aggregation of similar students by school occurs on the basis of Racial-Ethnic Group Membership. Such aggregation occurs to a somewhat lesser extent for Socio-Economic Status and to an even lesser extent for Family Structure and Stability. The percentages for the other measures reflect both the allocation of students into schools on the basis of these attributes and the possible effects of the schools on these attributes. Not surprisingly, the highest percentage here is for ACHV. The next highest is for Attitude Toward Life, which is followed by Study Habits and by Educational Plans and Desires. The smallest value, 6 percent, occurs for Expectations for Excellence. Clearly, then, some of the highest values occur for variables that can be taken to represent the family's social structural background or, as we have preferred to call it, Home Background.[4] Of the variables that do not form part of Home Background, the highest values are for Achievement and Attitude Toward Life. The value of 16 percent for Attitude Toward Life, it will be recalled, represents the percentage of it that is eliminated when differences among schools are set aside.

We have already shown in the Achievement Study (Mayeske et al., 1972b, chapter 5) that the regional variation in DAS is considerable. The percentages are higher in the South than in the North, and in the North they are higher in metropolitan than in nonmetropolitan areas. The differences between North and South are especially pronounced for Racial-Ethnic Group Membership and for Attitude Toward Life.

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[1] The data analysis model that yields these kinds of correlation is described in the appendix.

[2] To be technically correct we must recognize that it is theoretically possible for this value to get larger if other individual student variables are first entered into the regression. The conditions under which this happens are peculiar and seldom occur in practice (see the Technical Supplement).

[3] In these questions the term "individual level" is used to refer to total differences among students and to differences among students within schools, while the term "aggregate level," or "school level," is used to refer to differences among schools.

[4] Consisting of Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership.

Table 4.1.—Percentage of Variation in Individual Student Measures Associated With the Schools Students Attend

Set of Variables	Percentage
Socio-Economic Status (SES)	·26
Family Structure and Stability (FSS)	12
Racial-Ethnic Group Membership (RETH)	57
Achievement (ACHV)	27
Expectations for Excellence (EXPTN)	6
Attitude Toward Life (ATTUD)	16
Educational Plans and Desires (EDPLN)	9
Study Habits (HBTS)	10
Number of Schools	923
Number of Students	133,136

4.2. CORRELATES OF ATTITUDE TOWARD LIFE AT THE INDIVIDUAL AND SCHOOL LEVELS

Before considering our second question we may focus on how total ("T"), among- ("A"), and within-school ("W") analyses are conducted. It will be recalled that the data analysis model we are using generates correlations among individual students, among schools, and between individual students and the schools they attend. For illustrative purposes let us assume that we want to conduct a regression analysis of Attitude Toward Life (ATTUD) and Socio-Economic Status (SES). The "T" analysis for individual students consists in computing the correlations among students regardless of school attended. The "A" analysis consists in computing the correlations among schools. Finally, the "W" analysis consists in partialing out the among-school counterpart from individual ATTUD and then regressing the adjusted ATTUD scores on individual SES. This technique results in an adjusted score that is independent of differences among schools.

By way of illustrating each type of analysis, correlations of Achievement and each of the Family Background measures with Attitude Toward Life are shown in table 4.2.[5] The first thing we should note about these correlations is that they are much higher for the "among" than for the "total" or the "within" analyses. These higher values are due in part to two facts, the first sociological and the second statistical. The first is that students who are similar with regard to these attributes attend school with one another. The second is that mean values tend to be more stable and more predictable than individual values. It will also be seen that the "within" correlations are somewhat smaller than the "total" correlations, particularly for the variables in table 4.1 that were shown to be more highly related to differences among schools. For example, Racial-Ethnic Group Membership was most highly related to differences among schools and it also shows a large decrement in its relation with Attitude Toward Life when differences among schools in Attitude Toward Life are partialed out.

Another point worth noting is that the variables that have the highest correlation with Attitude Toward Life for the "total" analyses are not always highest in the "among" analyses. A good example here is Family Structure and Stability. Just why this should be so is not immediately apparent. It seems likely that the relationship of the variables associated with Socio-

[5] These values differ somewhat from those given in chapters 2 and 3 since they include the approximately 5,000 students who either indicated they belonged to the racial-ethnic group labeled "Other" or did not respond to that item.

Table 4.2.—Correlation of Attitude Toward Life (ATTUD) for Total, Among, and Within Differences

Set of Variables	Level of Analysis Total	Among	Within
Socio-Economic Status (SES)	38	64	31
Family Structure and Stability (FSS)	33	77	26
Racial-Ethnic Group Membership (RETH)	47	71	41
Achievement (ACHV)	47	76	45
Expectations for Excellence (EXPTN)	50	82	46
Study Habits (HBTS)	45	61	43
Educational Plans (EDPLN)	30	66	15
Multiple Correlation [1]	62	89	57

[1] Multiple correlation of all 7 row variables with ATTUD. These values are based upon 133,136 9th-grade students and their 923 schools.

Economic Status and Racial-Ethnic group membership at the individual level are further accentuated at the among-school level. More generally, we might argue that any variable, A, that has a strong relationship with variables B, C, D, involved in the allocation of students into schools will have a more pronounced relationship with B, C, D at the school level, and hence also with X, Y, Z, which happen to be related to B, C, D. Clearly, the differences in these correlational values for the three levels of analysis "T," "A," and "W" suggest that the relative roles of Home Background, Family Process, and Achievement in Attitude Toward Life may differ considerably at each level. This topic is explored in the next section.

4.3. COMMONALITY ANALYSES OF FAMILY BACKGROUND AND ACHIEVEMENT WITH ATTITUDE TOWARD LIFE AT THE INDIVIDUAL AND SCHOOL LEVEL

In this section we shall attempt to determine how the roles of Home Background, Achievement, and Family Process change as the analysis moves from the individual to the school level. In this way we hope to learn something about their relative importance at both the aggregate and the individual level. We shall conduct three different types of analysis. The first type analyzes the relative roles of these three variables without regard to Racial-Ethnic Group Membership. This type of analysis has been labeled "U," for unadjusted. The second type was labeled "I" because it includes Racial-Ethnic Group Membership. The third type, "A," uses partial correlation techniques to adjust the differences among students in their Attitude Toward Life that are associated with Racial-Ethnic Group Membership, and then performs regression analyses on the adjusted scores. Thus for each of the three levels of analysis ("T," "A," and "W") there are three types of analysis ("U," "I," and "A").

4.3.1. Commonality Analyses Without Regard to Racial-Ethnic Group Membership

Figure 4.1 shows the "U" analyses for the percentages of variation, or R-squares, in Attitude Toward Life (ATTUD) accounted for at each level of analysis as first HB, then HB-ACHV, and finally FB-ACHV are entered into the regression.[6] Such an

[6] Where HB is comprised of SES and FSS, and FB is comprised of HB plus the three PRCS measures of EXPTN, EDPLN, and HBTS—a set of five variables in all. The numbers of students and schools used in these analyses were, respectively: nonmetropolitan North, 15,552 and 160; metropolitan North, 67,535 and 249; nonmetropolitan South, 33,076 and 411; metropolitan South, 16,973 and 103. The base numbers for the marginal values are merely the sums for the appropriate regions.

FIGURE 4.1. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND AND ACHIEVEMENT FOR TOTAL(T), AMONG(A), AND WITHIN(W) DIFFERENCES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS NOT INCLUDED(U)

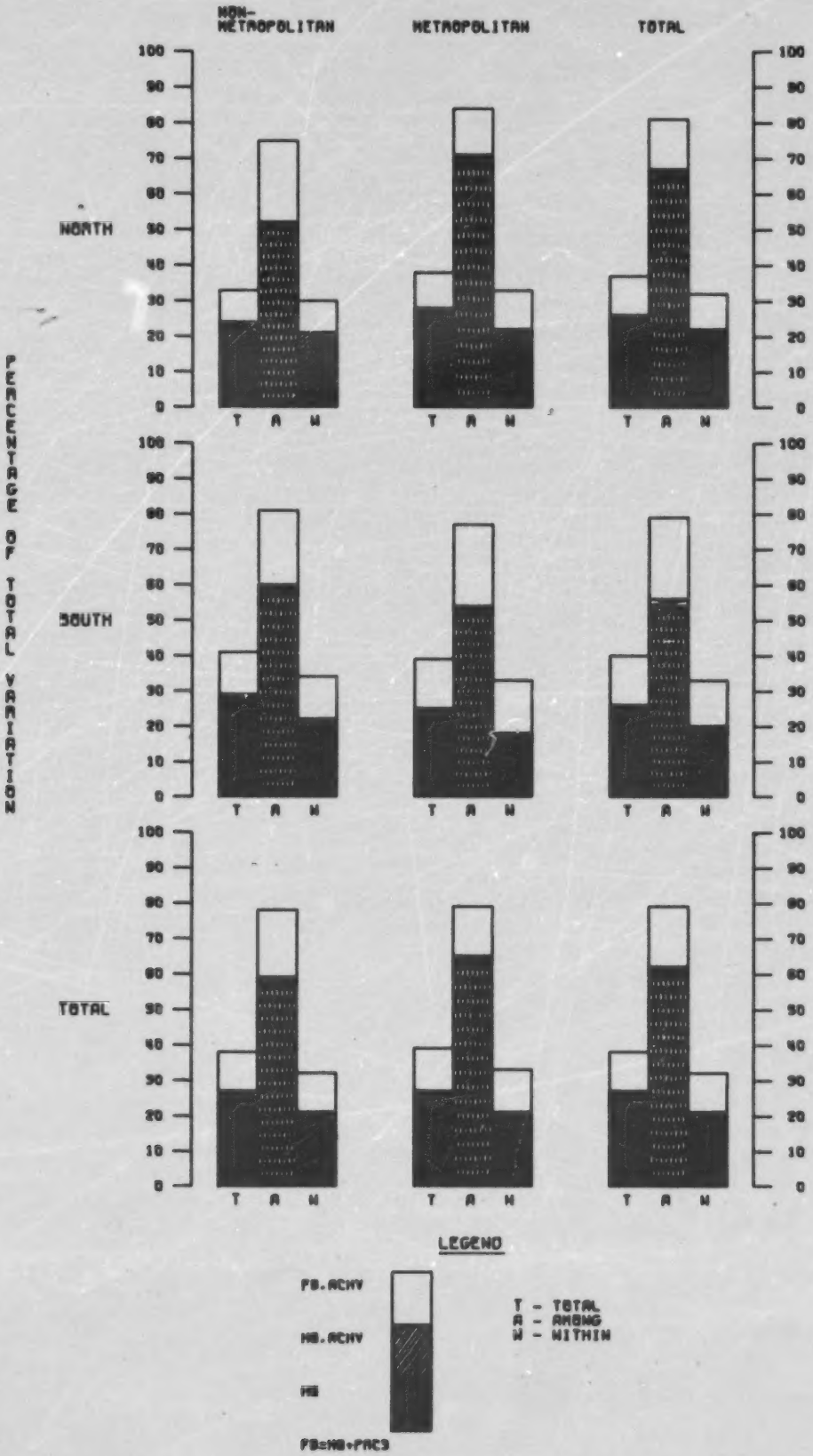


FIGURE 4.2. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND AND ACHIEVEMENT FOR TOTAL(T), AMONG(A), AND WITHIN(W) DIFFERENCES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS INCLUDED(I)

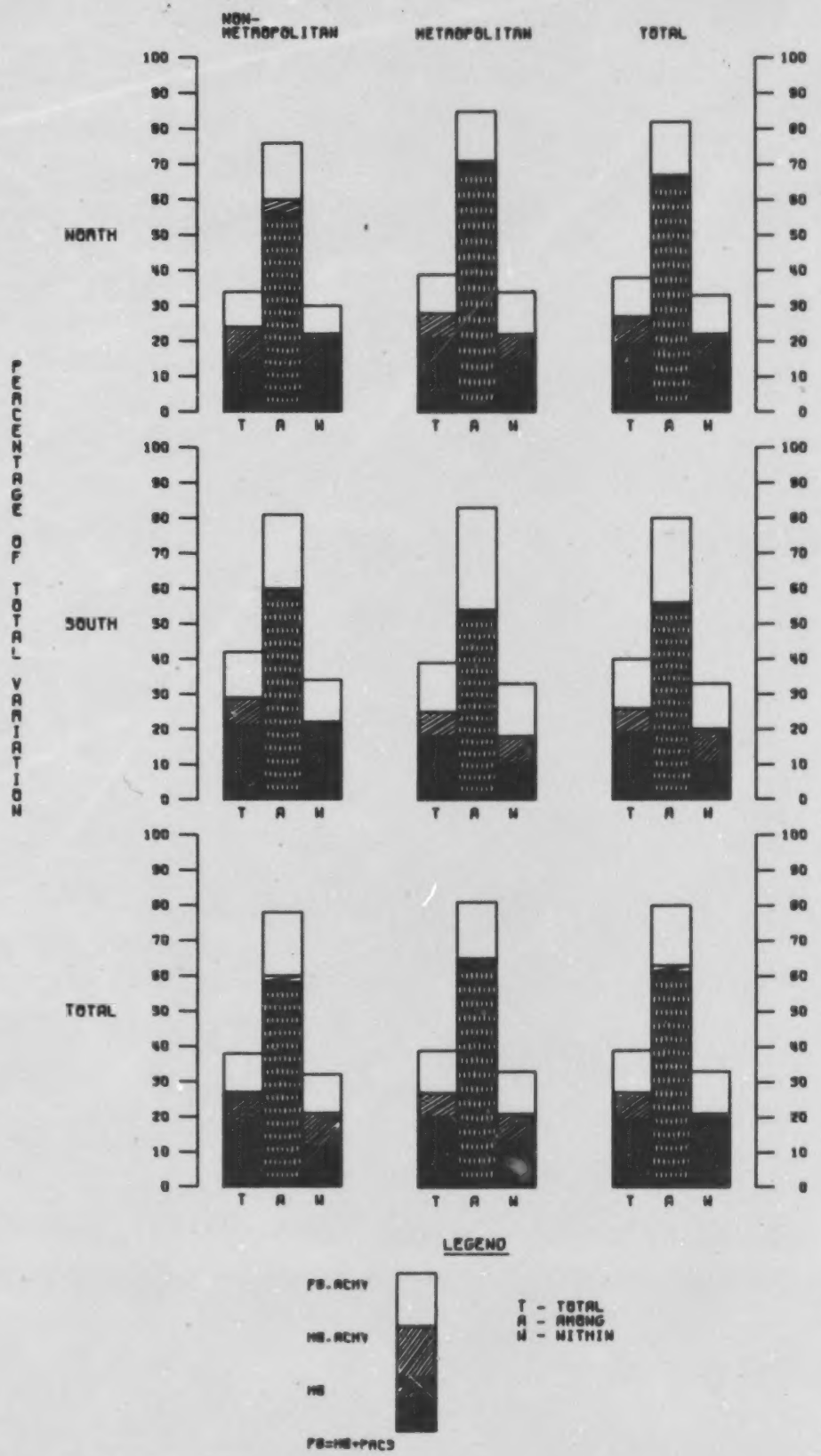


Table 4.3—Commonality Analyses of Family Background and Achievement With Attitude Toward Life for Total (T), Among (A), and Within (W) Differences, by Geographic Locale and Region, When Racial Ethnic Group Membership Is Not Included

Region	Level of Analysis	Nonmetropolitan Unique HB-ACHV	Nonmetropolitan Unique PRCS	Nonmetropolitan Common	Metropolitan Unique HB-ACHV	Metropolitan Unique PRCS	Metropolitan Common	Total Unique HB-ACHV	Total Unique PRCS	Total Common
North	T	13	30	57	11	28	61	12	29	59
	A	3	31	66	5	15	80	5	18	77
	W	14	29	57	8	35	57	9	34	57
South	T	16	30	54	11	36	53	13	34	53
	A	15	26	59	16	30	54	15	29	56
	W	10	35	55	7	45	48	9	40	51
Total	T	15	29	56	12	30	58	13	30	57
	A	13	24	63	10	18	72	11	21	68
	W	12	33	55	8	37	55	9	36	55

analysis allows us to see the extent to which each set or combination of sets increases the percentage of variation accounted for at each level. Thus, we can note that the percentage of variation is uniformly lower for the nonmetropolitan North than for the other regional groups. It will also be seen that in each region at the "T" and "W" levels Achievement shows increases roughly 8 to 10 percent larger than does Home Background in the percentage of variation explained, although the increases are negligible at the "A" level.[7] However, when we compare the results for FB-ACHV with those for HB-ACHV (these results show the effect of bringing in the PRCS set), the increases are much greater at the "A" level than at either of the other two levels. In fact, the increase produced by bringing in PRCS varies from about 9 to 15 percent at the "T" and "W" level, and from 13 to 23 percent at the "A" level.[8] This is indeed a substantial difference. It suggests that PRCS may have some effect on ATTUD at the school level that it does not have at the individual level. It is only natural, then, to inquire further into the relative roles played by these sets of variables.

In order to make the results easier to follow we have limited ourselves to two sets of variables, one consisting of HB and ACHV combined and the other of the three PRCS measures. The results of the unitized commonality analyses for these sets are given in table 4.3. It will be seen here that there is a tendency for the common portion to increase at the "A" level over its values at the "T" and "W" level, while the tendency for the unique roles for HB-ACHV and PRCS is to shrink somewhat at the "A" level. This shrinkage is much less pronounced in the South than in the North; in fact, the value of the unique role for HB-ACHV at the "A" level in the South tends to equal or exceed its counterparts at the "T" and "W" level. Similarly, the increase in the common portion as the analysis moves from the "T" and "W" to the "A" level is much greater in the North than in the South. As we noted in section 4.1, the relationship of each of the Family Background measures, especially Socio-Economic Status, Racial-Ethnic Group Membership, and Achievement, with differences among schools, was greater in the South than in the North. We suspect that this more pronounced relationship keeps the relative roles of the HB-ACHV and PRCS sets more nearly similar for the different levels in the South than in the North.

It is not the similarities, however, but the differences that stand out. In every region and for each level of analysis two trends can be discerned:

1. The unique role for PRCS exceeds that for HB-ACHV, often to a substantial degree.
2. The magnitude of the common portion exceeds that of the unique roles, either alone or when added together.[9]

Clearly, then, there is a great deal of confounding in the way these two sets of variables relate to Attitude Toward Life for each level of analysis. In the next section we will see how these results change when Racial-Ethnic Group Membership is brought into the analysis.

4.3.2. Commonality Analyses When Racial-Ethnic Group Membership Is Included

The topic of this subsection is the way in which the relative roles in Attitude Toward Life (ATTUD) of Home Background (HB), Achievement (ACHV), and Family Process (PRCS) differ at each level of analysis when Racial-Ethnic Group Membership (RETH) is included as part of Home Background. Figure 4.2 shows the percentage of variation in ATTUD accounted for as first HB, then HB-ACHV, and finally FB-ACHV is entered into the regression. It will be seen that the results here are remarkably similar to those in the previous section: at the individual level, ACHV has an increase of 7 to 11 percent in variation accounted for at the "T" and "W" level, but one of only 1 to 4 percent at the "A" level.[10] On the other hand, the PRCS set makes a much greater contribution at the "A" level than at the "T" and "W" level.[11] In short, figure 4.1 resembles figure 4.2. From this we conclude that the inclusion of RETH as an aspect of HB has a negligible effect on the R-squares.

Our next step was to see how the inclusion of RETH might affect the results of commonality analyses. As in the previous section we used only two sets of variables, one consisting of the three HB variables of SES, FSS, and RETH, plus ACHV, and the other of the three PRCS variables of EXPTN, EDPLN, and HBTS. The results of unitized commonality analyses with these sets of variables are given in table 4.4. Here, too, we find close resemblances with the previous section: for example, in every region and for almost every level of analysis, the unique role for PRCS exceeds that of HB-ACHV, but their unique roles, when added together, seldom exceed the magnitude of their common

[7] See the R-squares for HB-ACHV compared with those for HB alone.
[8] See the R-squares for FB-ACHV compared with those for HB-ACHV.
[9] Except in the case of the metropolitan South at the "W" level.
[10] See the R-squares for HB compared with those for HB-ACHV.
[11] Determined by comparing the height of the bar for all 3 areas with that for the 2 lined areas.

FIGURE 4.3. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND AND ACHIEVEMENT FOR TOTAL(T), AMONG(A), AND WITHIN(W) DIFFERENCES WHEN ADJUSTMENTS ARE MADE FOR RACIAL-ETHNIC GROUP MEMBERSHIP ("A")

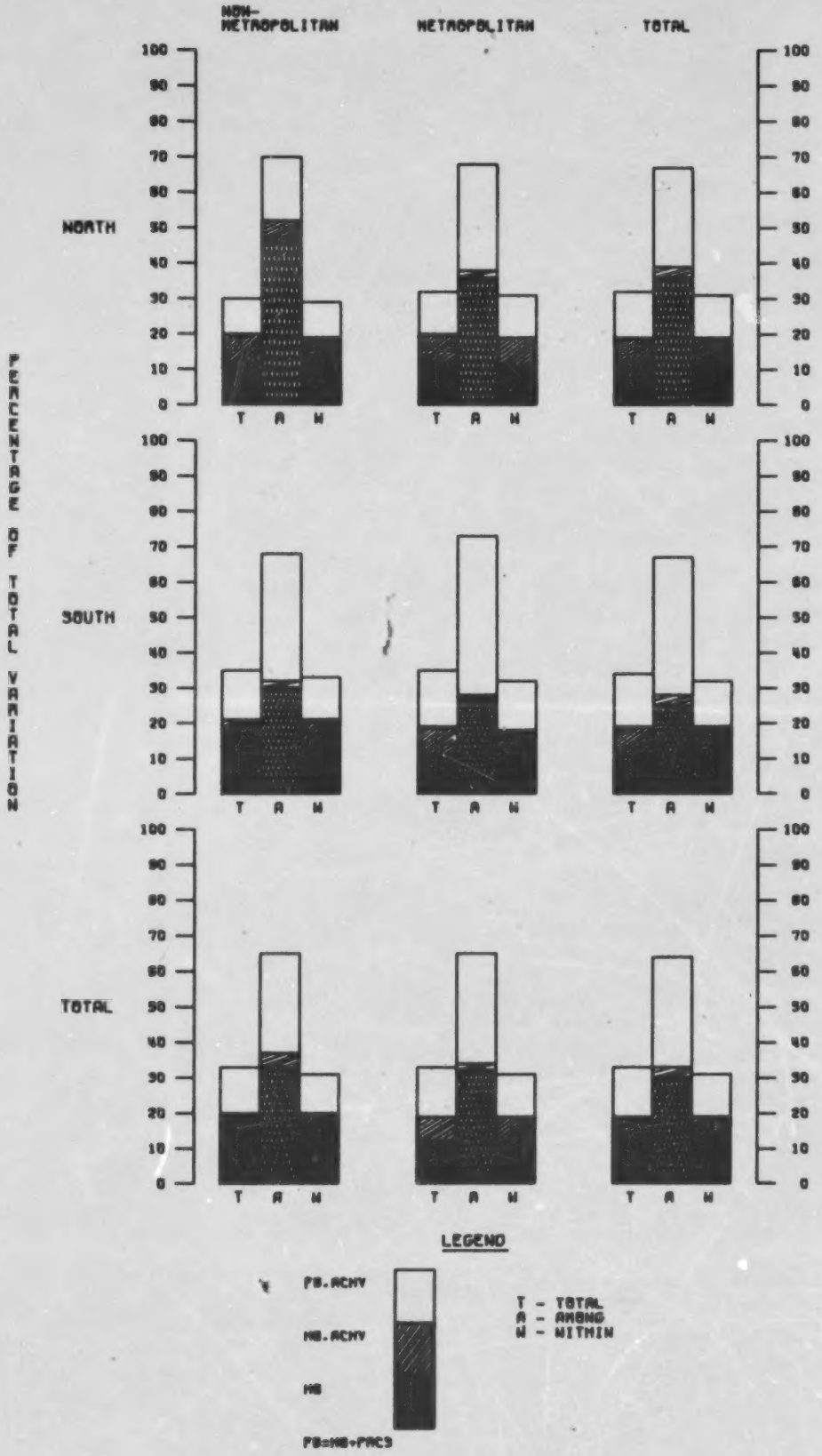


Table 4.4.—Commonality Analyses of Family Background and Achievement With Attitude Toward Life for Total (T), Among (A), and Within (W) Differences, by Geographic Locale and Region, When Racial-Ethnic Group Membership Is Included

Region	Level of Analysis	Nonmetropolitan Unique HB-ACHV	Nonmetropolitan Unique PRCS	Nonmetropolitan Common	Metropolitan Unique HB-ACHV	Metropolitan Unique PRCS	Metropolitan Common	Total Unique HB-ACHV	Total Unique PRCS	Total Common
North	T	13	30	57	13	29	58	13	30	57
	A	3	20	77	7	17	76	6	18	76
	W	14	29	57	9	35	56	10	34	56
South	T	17	31	52	13	37	50	15	35	50
	A	15	26	59	21	34	45	17	30	53
	W	11	35	54	7	45	48	9	40	51
Total	T	16	30	54	13	31	56	14	31	55
	A	13	23	64	13	20	67	12	22	66
	W	12	33	55	8	37	55	9	36	55

portion (compare the corresponding values in table 4.3). We therefore concluded that the inclusion of RETH as an aspect of HB had a small-to-negligible effect on both the percentage of variation accounted for and the magnitude of the relative roles played by HB-ACHV and PRCS.

4.3.3. Commonality Analyses When Adjustments Are Made for Racial-Ethnic Group Membership

In this subsection we ask: How do the relative roles in Attitude Toward Life (ATTUD) of Home Background (HB), Achievement (ACHV), and Family Process (PRCS) change as the analysis moves from the individual to the school level, when adjustments are first made in Attitude Toward Life for Racial-Ethnic Group Membership (RETH)? The percentage of variation of ATTUD accounted for by HB alone, then by HB and ACHV, and finally by FB-ACHV is given in figure 4.3. It will be seen that the percentages are lower here than in the preceding sections. However, the relative behavior of these sets of variables is very similar. For example, when ACHV is brought into the regression with HB the result is an increase that ranges from 8 to 11 percent at the individual level but from only 1 to 5 percent at the school level. Similarly, when PRCS is brought into the regression, the result is an increase of 10 to 16 percent at the individual level and 18 to 45 percent at the school level.[13] Clearly, the contribution of PRCS is larger at the school than at the individual level, while just the opposite holds for ACHV.

But how, we may ask, do the relative roles of HB-ACHV and PRCS compare when placed in the framework of a commonality analysis? Results of unitized commonality analyses for these two sets of variables are given in table 4.5, from which it can be seen that there is a greater tendency than heretofore for the unique role of PRCS to exceed that of HB-ACHV. In fact, the sum of the unique roles tends to exceed the common portion in the South but not in the North, whereas in prior sections the common portions consistently exceeded the unique roles for almost all levels and regions. Clearly, then, when we first adjust ATTUD for RETH we tend to eliminate some of the overlap or confounding between these two sets of variables as they relate to ATTUD. This reduction tends to be greater in the South and metropolitan North than in the nonmetropolitan North, particularly at the school level. As we suggested earlier, the relationship of SES and RETH with differences among schools, as well as with one another, is greater in these regions than in the nonmetropolitan North. Consequently, when ATTUD is first adjusted for RETH the unique portion for HB-ACHV, as well as its portion shared with PRCS, is thereby reduced. Hence, the most salient result of these analyses is that the role of PRCS comes to exceed that of HB-ACHV, usually to a substantial extent.

4.4. SUMMARY

In this chapter we have reviewed the relative roles of Home Background (HB), Achievement (ACHV), and Family Process (PRCS) in the development of Attitude Toward Life (ATTUD) at the individual and at the aggregate, or school, level. Our data analysis model treated the attributes of the school a student attended as if they were his own attributes. This allowed us to

Table 4.5.—Commonality Analyses of Family Background and Achievement With Attitude Toward Life for Total (T), Among (A), and Within (W) Differences, by Geographic Locale and Region, When Adjustments Are Made for Racial-Ethnic Group Membership

Region	Level of Analysis	Nonmetropolitan Unique HB-ACHV	Nonmetropolitan Unique PRCS	Nonmetropolitan Common	Metropolitan Unique HB-ACHV	Metropolitan Unique PRCS	Metropolitan Common	Total Unique HB-ACHV	Total Unique PRCS	Total Common
North	T	12	34	54	8	39	53	9	39	52
	A	3	26	71	1	44	54	2	42	56
	W	13	32	55	8	39	53	9	38	53
South	T	10	41	49	7	46	47	8	45	47
	A	9	53	38	18	61	21	11	58	31
	W	10	37	53	7	45	48	9	41	50
Total	T	11	38	51	8	41	51	9	41	50
	A	9	44	47	7	48	45	7	48	45
	W	11	35	54	8	40	52	9	39	52

[13] See the areas for FB-ACHV compared with those for HB-ACHV.

compute three different kinds of correlation:

1. Correlations based upon differences among individual students.
2. Correlations based on differences among schools.
3. Correlations based on differences among students that are independent of differences among the schools they attend.

These correlations formed the basis for regression and commonality analyses.

The first question addressed in this chapter was: To what extent are Attitude Toward Life, Achievement, and the various Family Background measures associated with the schools students attend? In order to answer this question we observed the squared correlation of each student variable with its school mean counterpart. We found that there was a pronounced tendency for students of similar Socio-Economic Status, Racial-Ethnic Group Membership, and Achievement to go to school with one another. The same was true to a somewhat lesser extent of Attitude Toward Life, Family Structure and Stability, and Family Process.

When we carried out these same analyses for different geographic groups we found that, for each one of these variables, the values in the South were higher than those in the North, while in the North the values in the metropolitan areas were higher than those in the nonmetropolitan areas. Thus, a southern student was more likely to attend school with other students who were like himself with respect to these attributes than was a northern student. Of course, all these findings apply to the schools as they were in about 1965.

The second question addressed in this chapter was: How do the relative roles of Home Background, Family Process, and Achievement in Attitude Toward Life change at the individual and aggregate (i.e., school) level? In order to answer this question we conducted comparative analyses for differences among students (designated "T" for "total"), differences among schools (designated "A" for "among"), and differences among students within schools (designated "W" for "within"). For the "T" analysis we used correlations based upon differences among individual students, for the "A" analysis correlations based upon differences among school means, and for the "W" analysis correlations among individual students. In the case of the "W" analysis we began by using partial correlation techniques to partial out the among-school counterpart from the dependent variable. For example, a "W" analysis of Attitude Toward Life was designed to partial school Attitude Toward Life out of individual student Attitude Toward Life and then regress these adjusted scores against other individual measures, such as Socio-Economic Status. The adjusted scores obtained by this partialing operation were independent of the differences among schools. The "T" and "W" analyses were referred to as analyses at the individual level, and the "A" analyses as ones at the aggregate level.

The analyses connected with this second question made allowance for three different conditions or statuses of Racial-Ethnic Group Membership. In the first condition, called "U," Racial-Ethnic Group Membership was not entered into the analysis. In the second, called "I," it was included as an aspect of the student's Home Background. In the third, called "A," Attitude Toward Life was first adjusted for Racial-Ethnic Group Membership by means of partial correlation techniques, and then regressions were run with these adjusted scores. In order to reduce the number of comparisons to be made we ran analyses with only two sets of variables. The first set contained Achievement (ACHV) and the set of variables known as Home Background (HB), while the second contained the set known as Family Process (PRCS).

Comparative commonality analyses for the three levels ("T," "A," and "W") and three conditions ("U," "I," and "A") of analysis are given below. The correlations at the "A" level were usually much larger than at the "T" or "W" level. For example, the squared multiple correlation between Attitude Toward Life, Family Background (HB and PRCS combined), and Achievement was 39 at the "T" level, 33 at the "W" level, and 80 at the "A" level.[13] In order to make the results at these levels more comparable, the commonality analyses were "unitized" (see p. 18). We summarized these analyses by dividing the unique role for the PRCS set by that for the HB-ACHV set. When the ratio so obtained was greater than 1 it indicated that the unique role of the PRCS set exceeded that of HB-ACHV—the larger the value, the greater the extent by which it did so. When the ratio was less than 1, the opposite was true. These ratios are:

Level of Analysis			
T	2.3	2.2	4.6
A	1.9	1.8	6.7
W	4.0	4.0	4.3
	U	I	A
	Type of Analysis		

It will be seen from these ratios that at every level and for each type of analysis the role of the PRCS set exceeds that of the HB-ACHV set. The amount by which it does so is greater at the "T" and "W," or individual, level than at the "A," or school, level, except for the "A" type of analysis, where the reverse is true. With regard to type of analysis, whether RETH is left out of the analysis ("U") or entered explicitly as an aspect of HB ("I") seems to have little effect on the relative roles of these two sets of variables. However, when ATTUD is first adjusted for RETH, the role of PRCS relative to that of HB-ACHV is augmented somewhat, especially at the "A" level.

These ratios, however, do not tell the whole story, for in every case there were substantial common portions. For the "U" and "I" types of analyses the magnitude of the common portions exceeded the magnitude of the sum of the unique portions, while for the "A" type they were more nearly equal. Hence, at every level there was a substantial confounding of these two sets of variables as they related to ATTUD. This means that, for both individual students and schools, those who rank high or low on the variables in one set *tend* to rank in a corresponding manner on the other set. We emphasize *tend* because there are sufficient differences at the different levels, in both the common and unique portions of these sets, for us to conclude that the trends we detected are not uniform.

When regional differences in these ratios were examined it was noted for each region and for each level of analysis that the

[13] These figures are for the "I" condition only. Comparable figures for the "U" and "A" conditions are given in figures 4.1 and 4.3.

ratios were larger for the "A" condition than for the "U" and "I" condition. This means that the unique role of the PRCS set exceeds that of the HB-ACHV set to a greater extent in each region when ATTUD has first been adjusted for RETH. For each condition, the ratios at the school level were greater in the North than in the South. We conjectured that the South's more pronounced aggregation of students into schools on the basis of their Socio-Economic Status and Racial-Ethnic Group Membership, and to some extent on the basis of other Family Background measures as well, tended to keep these sets of variables on a more nearly equal footing there than in the North.

In summary, we may conclude that the behavior of these variables and sets of variables in relation to Attitude Toward Life is sufficiently different at the individual and school level to warn us against using results at one level as equivalent to results at the other.

5. Family Background, Achievement, and School Factors in Attitude Toward Life

We have seen that the roles of Family Background and Achievement in Attitude Toward Life vary not only by racial-ethnic group and sex but by geographic locale. In the previous chapter we examined the manner in which students were allocated to schools and the implications of this for the relationships between the same sets of variables. In this chapter we go on to examine variations in possible school influences, also by locale, racial-ethnic group, and sex. The major question addressed is: How do the relative roles in Attitude Toward Life of Family Background, Achievement, and the various school factors differ for these groups of students?[1]

5.1. VARIATIONS IN ATTITUDE TOWARD LIFE BY FAMILY BACKGROUND, ACHIEVEMENT, SCHOOL FACTORS, AND GEOGRAPHIC LOCATION

In this section we shall try to learn three things about the relative roles of Family Background (FB), Achievement (ACHV), and School (SCH) in Attitude Toward Life (ATTUD). The first is how these roles differ by geographic location; the second is how the roles change when Racial-Ethnic Group Membership (RETH) is entered into the analysis; and the third is how the roles of the various SCH subsets compare with each other.

Before we proceed with the analyses we should explain that school influences were represented by a set of 10 school variables, although many more were available. However, in view of the small number of schools in some of the geographic groups and our desire to conserve on degrees of statistical freedom, we used only 10. In selecting the 10 variables we were guided by the results of earlier analyses (Coleman et al., 1966; Mayeske et al., 1972a; 1972b). These showed that the two most important aspects of a school for an individual student's achievement were the achievement and motivational levels of his fellow students together with certain attributes of the teaching staff. We had already used the 10-variable set in an earlier work (Mayeske et al., 1972a); preliminary analyses showed that it could be used here in the same way.[2] The 10 variables in question were as follows:

1. A set known as School Outcomes (SO), consisting of Student body's Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement.[3]
2. A set known as T(5), consisting of the average verbal skills of the teaching staff, their racial-ethnic composition, their view of their teaching conditions, their preference for working with students of different ability levels, and their salary and training levels.[4]

The numbers of students and schools included in these analyses is the same as in chapter 4.

Figure 5.1 shows the percentage of variation in Attitude Toward Life (ATTUD) accounted for by Family Background (FB) and Achievement (ACHV), on the one hand, and by Family Background and Achievement together with School (SCH), on the other. The plain portions indicate the percentage of variation in ATTUD accounted for by the set of SCH factors after differences among students in FB and ACHV have been taken into account. These values range from a low of 3 to 5 percent in the nonmetropolitan North to a high of 7 to 8 percent in the nonmetropolitan South. It is clear, then, that the role played by SCH in ATTUD, independently of FB and ACHV, is greater in the South than in the North. Just why this should be so will become apparent after we have observed the manner in which the possible influence of SCH on ATTUD is apportioned among FB and ACHV for the different regional and racial-ethnic groups.

In this section, we are mainly concerned with the relative roles in ATTUD of FB and ACHV when the latter are placed in context with the set of 10 school factors (SCH). With three sets of variables, three types of analysis, and four or more regional groups the number of possible comparisons becomes unwieldy. In order to reduce it, we used a simplifying strategy; viz, we observed the extent to which the variation in ATTUD associated with SCH was apportioned between FB and ACHV, and the extent to which it was unique to SCH. It was the commonality model that enabled us to do this. We have explained elsewhere how the variance in a dependent variable associated with a set of variables can be partitioned among a number of different sets (p. 19). For those sets of interest to us here this partitioning would be:

$$R^2(SCH) = C(FB,ACHV,SCH) + C(ACHV,SCH) + C(FB,SCH) + U(SCH)$$

where the C's represent the variance associated with SCH that is confounded with the other sets, while U represents the variance that is uniquely associated with SCH.

Since the R-squares varied somewhat by region we divided each term in the equation by $R^2(SCH)$ so that they would sum to 100 percent—an operation that we call "unitizing." In this way we were able to make direct comparisons of the percentages across regions. Unitized values for each type of analysis are given graphically in figure 5.2. Before we inspect this figure, however, it may be as well to analyze the regional values of

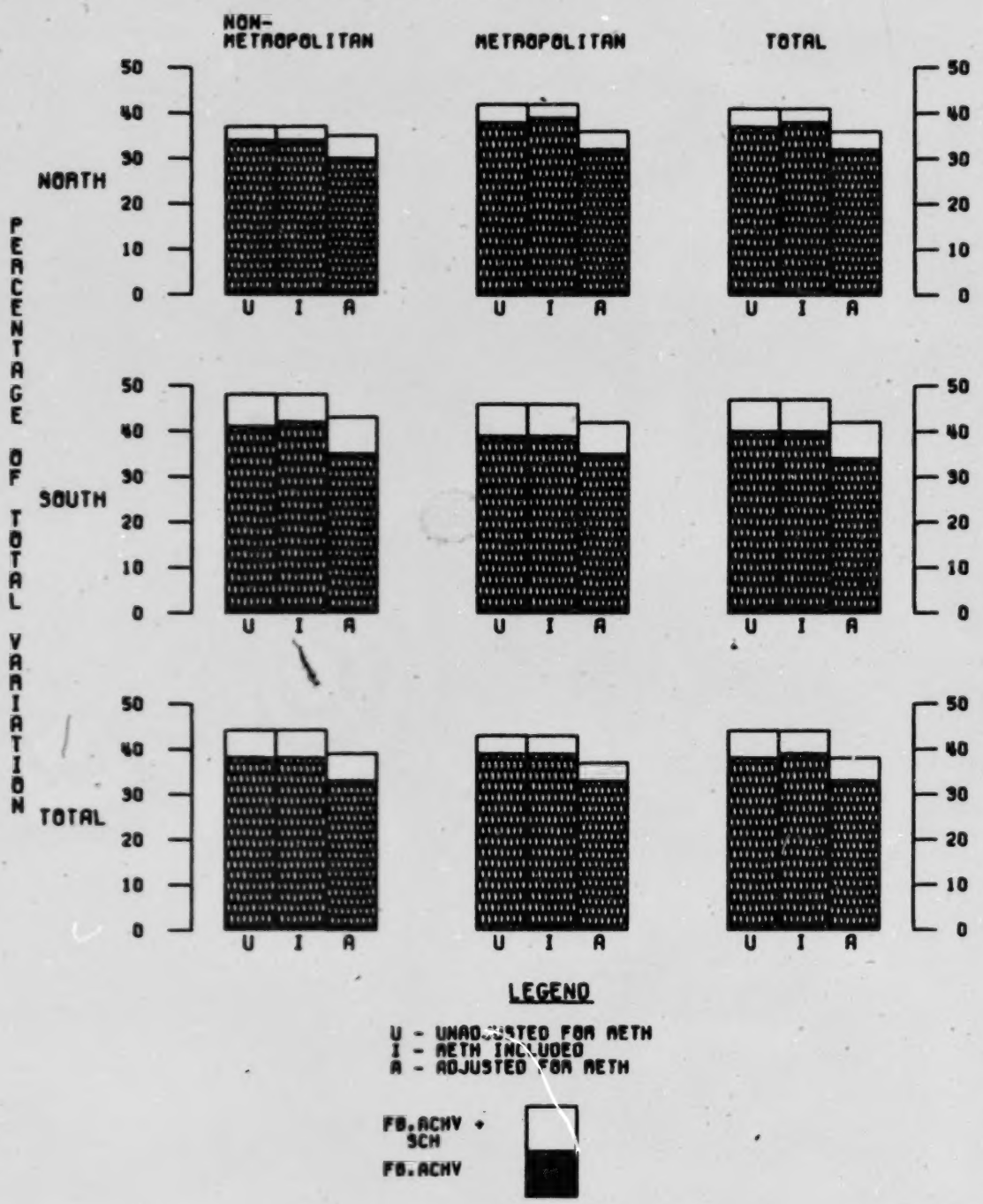
[1] This chapter deals entirely with 9th-grade students and their schools. For the school factors used see section 5.1.

[2] These preliminary analyses compared the magnitude of the squared multiple correlations obtained for a set of 36 school variables (including the set of 10) with that obtained for the set of 10 alone, when ATTUD was the dependent variable. The difference in these values was on the order of 0.0004, both before and after the student's FB and ACHV were taken into account. For these analyses all students were included in the same framework. The composition of these other 26 variables is described in the Student Study.

[3] The set was called School Outcomes (SO) because it represented, in part, the aggregate effect of the school.

[4] The set was called T(5) because it consisted of 5 teacher attributes.

FIGURE 5.1. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL MEASURES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED



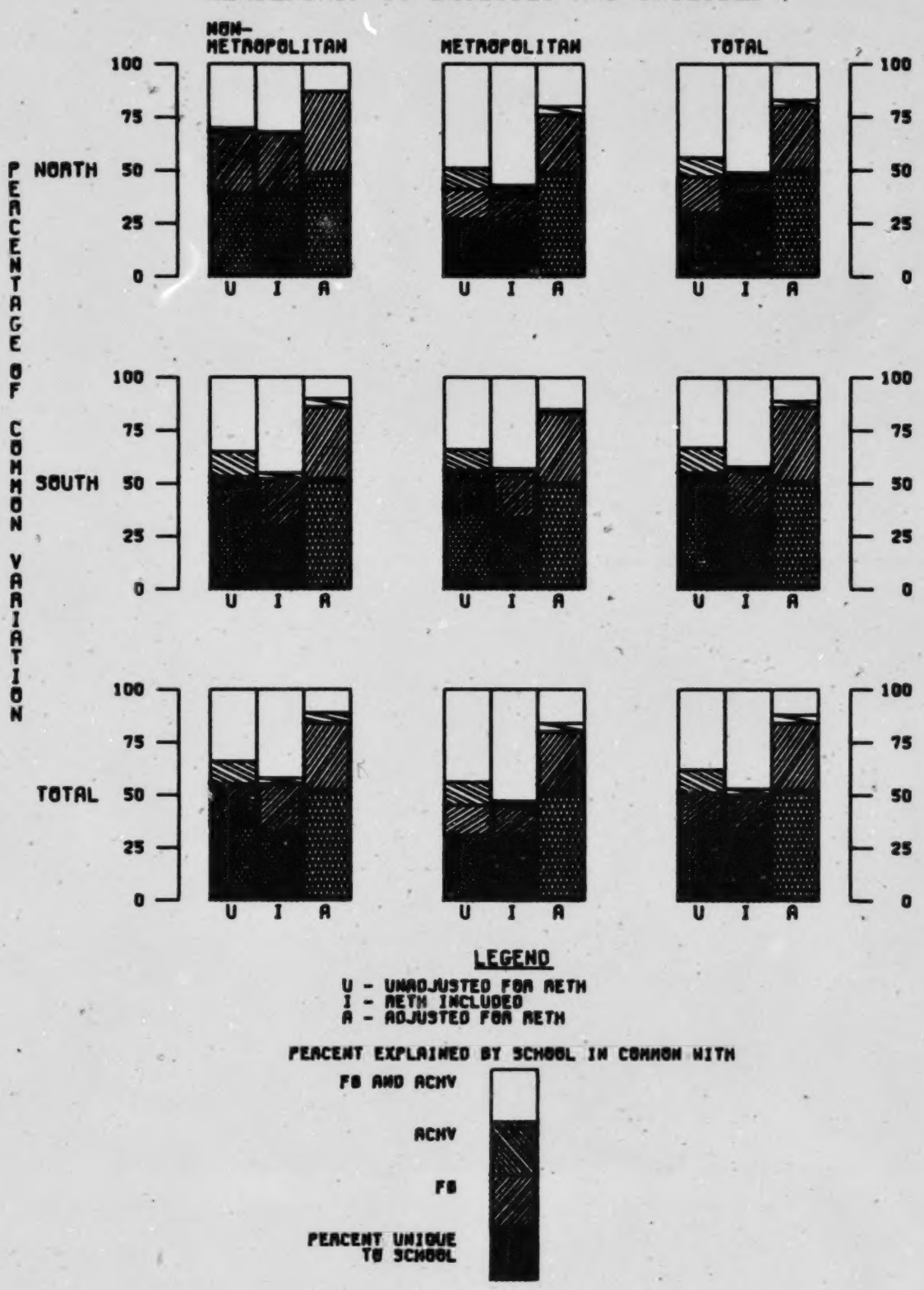
R^2(SCH) that were divided out. For the "I" type of analysis they were:

	Nonmet	Met	Total
North	10	13	12
South	23	20	21
Total	18	15	16

We can see that much more was divided out in the South than in the North. It follows that if we were comparing absolute values, each southern value would be greater than its northern counterpart.

If the reader compares the "U," "I," and "A" types of analysis in each region in figure 5.2, he will note that when Racial-Ethnic Group Membership (RETH) is included as an

FIGURE 5.2. - THE UNIQUE AND COMMON ROLES OF SCHOOL FACTORS IN ATTITUDE TOWARD LIFE WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED



aspect of Family Background (FB), the percentage that represents the confounding of School (SCH) and Achievement (ACHV)—the upper left to lower right slanted lines—is usually decreased, while the portion representing the confounding of the three sets, C(FB,ACHV,SCH)—the blank area—is increased. This latter increase is particularly substantial in the metropolitan North and in the South. Also, in these latter areas the portion that represents the confounding of FB and SCH (the areas with lines slanted from upper right to lower left) is increased slightly, while the unique portions (the double-slanted areas) are decreased. Clearly then, when RETH is included as an aspect of the student's FB, the confounding of FB with SCH, together and in combination with ACHV, is increased. Similarly, when Attitude Toward Life is first adjusted for Racial-Ethnic Group Membership, the trend is reversed—that is, the three-way confounding is decreased, while the unique portion as well as the confounding of Family Background with School is increased.

The main point to be noted is that *roughly one-fourth to one-half of the variance in Attitude Toward Life associated with School (the magnitude depends on the status of Racial-Ethnic Group Membership) can be uniquely associated with School.* In addition, most of the role of Achievement (ACHV) is confounded with Family Background (FB) and School (SCH). Hence, insofar as the influence of SCH is manifested in ATTUD in combination with FB and ACHV, it tends to be through the joint role of FB and ACHV, not merely in conjunction with ACHV.

Since all these things are so, the next logical step is to examine the role in Attitude Toward Life (ATTUD) of School Outcomes (SO), and of the five student body variables that make it up, when juxtaposed with the set of five teacher attributes (T(5)). The results of unitized commonalities with these two sets of variables are given in table 5.1 for several different conditions, viz:

"U": the relative roles of SO and T(5) before any adjustments in ATTUD have been made.

"HB": the relative roles of SO and T(5) after adjustments in ATTUD have been made for HB.[4]

"HB(I)": the same as "HB" except that RETH is included as a third variable.

"HB(I), ACHV": the same as "HB(I)" except that adjustments are also made for ACHV.

"FB(I), ACHV": the same as "HB(I), ACHV," except that adjustments have also been made for the three PRCS variables.

The percentage of variation in ATTUD accounted for by these sets of variables for the "U" condition was given on page 44. For the "FB(I), ACHV" condition the percentage of variance accounted for corresponds to the plain portions in figure 5.1. Values for the intermediate conditions are not shown here.

It will be seen from table 5.1 that for each condition in every regional group the unique role of T(5) ranges from negligible to zero. Similarly, the unique role for SO greatly exceeds both the unique role of T(5) and its common portion with SO. Clearly, among the possible school influences on ATTUD, SO is of major importance. By contrast, the role played by T(5) is always small, and is manifested through the common portion of T(5) and SO. The regional differences in these relationships are not marked; however, the common portions are slightly greater in the South than in the North.

Given the obvious importance of SO, it seemed appropriate to inquire which aspects of it play the greatest role. For this purpose we separated SO into two sets. The first set contained a single variable, Student Body's Attitude Toward Life (SATTUD), while the second contained the other four student body variables, and was therefore labeled "SO(4)."[5] We could then ask: What are the relative roles played by SATTUD and SO(4) in ATTUD, when analyzed together?

The results of the unitized commonality analyses, given in table 5.2, show that as ATTUD is adjusted for more and more aspects of the student's background, the independent roles of SATTUD and SO(4) increase, while their common portion decreases. The role of SATTUD outweighs that of SO(4) to an extent sufficient to support the conclusion that SATTUD is the major variable in the whole set of possible school influences. SO(4) also has a large enough role, both alone and in combina-

[4] Home Background, consisting of Socio-Economic Status (SES) and Family Structure and Stability (FSS).

[5] Consisting of student body's Expectations for Excellence, Educational Plans and Desires, Study Habits, and Achievement.

Table 5.1.—Commonality Analysis of School Outcomes (SO) and Teacher Attributes (T(5)), With Attitude Toward Life (ATTUD), Geographic Locale, Adjustment (ADJ), and Region

Region	ADJ[1]	Nonmetropolitan Unique SO	Nonmetropolitan Unique T(5)	Nonmetropolitan Common	Metropolitan Unique SO	Metropolitan Unique T(5)	Metropolitan Common	Total Unique SO	Total Unique T(5)	Total Common
North	U	85	0	15	59	0	41	65	0	35
	HB	94	1	5	90	1	9	91	1	8
	HB(I)	92	3	5	96	4	0	97	3	0
	HB(I), ACHV	91	1	8	96	1	3	97	1	2
	FB(I), ACHV	95	0	5	98	0	2	98	0	2
South	U	53	0	47	58	0	42	59	0	41
	HB	78	0	22	80	0	20	83	0	17
	HB(I)	91	0	9	89	1	10	95	1	4
	HB(I), ACHV	97	0	3	88	0	12	98	0	2
	FB(I), ACHV	88	0	12	84	0	16	92	0	8
Total	U	62	0	38	58	0	42	62	0	38
	HB	85	0	15	86	0	14	87	0	13
	HB(I)	94	0	6	97	2	1	98	1	1
	HB(I), ACHV	99	0	1	97	1	2	99	0	1
	FB(I), ACHV	93	0	7	94	0	6	96	0	4

[1] "U" designates no adjustment in ATTUD; "HB" designates ATTUD adjusted for HB; "HB(I)" designates ATTUD adjusted for HB including RETH; "HB(I), ACHV," designates ATTUD adjusted for HB(I) and ACHV; and "FB(I), ACHV," designates ATTUD adjusted for FB and ACHV including RETH.

Table 5.2.—Commonality Analyses of Student Body's Attitude Toward Life (SATTUD) and School Outcomes (SO(4)), With Attitude Toward Life, by Geographic Locale, Adjustment (ADJ) and Region

Region	ADJ[1]	Nonmetropolitan Unique SATTUD	Nonmetropolitan Unique SO(4)	Nonmetropolitan Common	Metropolitan Unique SATTUD	Metropolitan Unique SO (4)	Metropolitan Common	Total Unique SATTUD	Total Unique SO (4)	Total Common
North	U	25	0	75	16	0	84	19	0	81
	HB	47	10	43	39	13	48	42	12	46
	HB(I)	49	15	36	45	22	33	47	20	33
	HB(I), ACHV	44	33	23	48	48	4	48	42	10
	FB(I), ACHV	65	28	7	65	32	3	67	30	3
South	U	20	0	80	27	0	73	24	0	76
	HB	41	8	51	57	9	34	48	9	43
	HB(I)	47	10	43	62	10	28	55	10	35
	HB(I), ACHV	46	26	28	61	23	16	53	25	22
	FB(I), ACHV	66	20	14	78	18	14	72	19	9
Total	U	23	0	77	21	0	79	22	0	78
	HB	45	8	47	50	12	38	47	11	42
	HB(I)	51	11	38	67	18	25	54	16	30
	HB(I), ACHV	49	30	21	58	40	2	53	37	10
	FB(I), ACHV	69	21	10	75	25	0	73	24	3

[1] "U" designates no adjustment in ATTUD; "HB" designates ATTUD adjusted for HB; "HB(I)" designates ATTUD adjusted for HB including RETH; "HB(I), ACHV," designates ATTUD adjusted for HB(I) and ACHV; and "FB(I), ATTUD," adjusted for FB and ACHV including RETH.

tion with SATTUD, for us to conclude that it, too, plays an important part.

It will also be seen that the values for SATTUD tend to be slightly greater in the South than in the North, while just the reverse is true for the unique values of the other four variables that make up SO. Just why this should be so, and more generally why the role of SCH that is independent of FB and ACHV should be greater in the South than in the North, are points to which we shall return in the chapter summary, after we have examined these same kinds of relationship separately for each racial-ethnic group.

5.2. VARIATIONS IN ATTITUDE TOWARD LIFE BY FAMILY BACKGROUND, ACHIEVEMENT, SCHOOL FACTORS, SEX, AND RACIAL-ETHNIC GROUP MEMBERSHIP

In this section we shall take the same approach as in section 5.1, but with two major differences:

1. The racial-ethnic groups, each divided by sex, are examined separately.
2. Geographic differences are not examined until the next section (the number of comparisons would have been too great).

Accordingly, our main question is: How do the relative roles of Family Background (FB), Achievement (ACHV), and School (SCH) in Attitude Toward Life (ATTUD) differ by sex and racial-ethnic group membership? In addition to the separate group analyses we have included, for purposes of comparison, the same three kinds of "total" (T) analysis that we used before.[1]

Figure 5.3 shows what percentage of the variation in ATTUD is associated with FB, ACHV, and SCH for the different groups. The plain portions in this figure represent the percentage of variation that is associated with SCH independently of FB and ACHV. These portions, which are largest for the nonwhite groups, range from a high of 9 percent for Mexican-Americans through 7 percent for Indian Americans and Negroes, 6 percent for Puerto Ricans, and 5 percent for Oriental-Americans, to a low of 4 percent for whites. For the same portions, Indian, Mexican, and Negro males have larger values than their female counterparts, while for Oriental males the opposite is true. For Puerto Ricans and whites the values are about the same for both sexes.

As in the previous section, in order to reduce the number of comparisons to be made we shall present a partitioning of the variance in ATTUD associated with SCH, as follows:

$$R^2(SCH) = C(FB,ACHV,SCH) + C(ACHV,SCH) + C(FB,SCH) + U(SCH)$$

Here too, we shall divide by the $R^2(SCH)$ for each group, so that the results will sum to 100. The values divided out are:

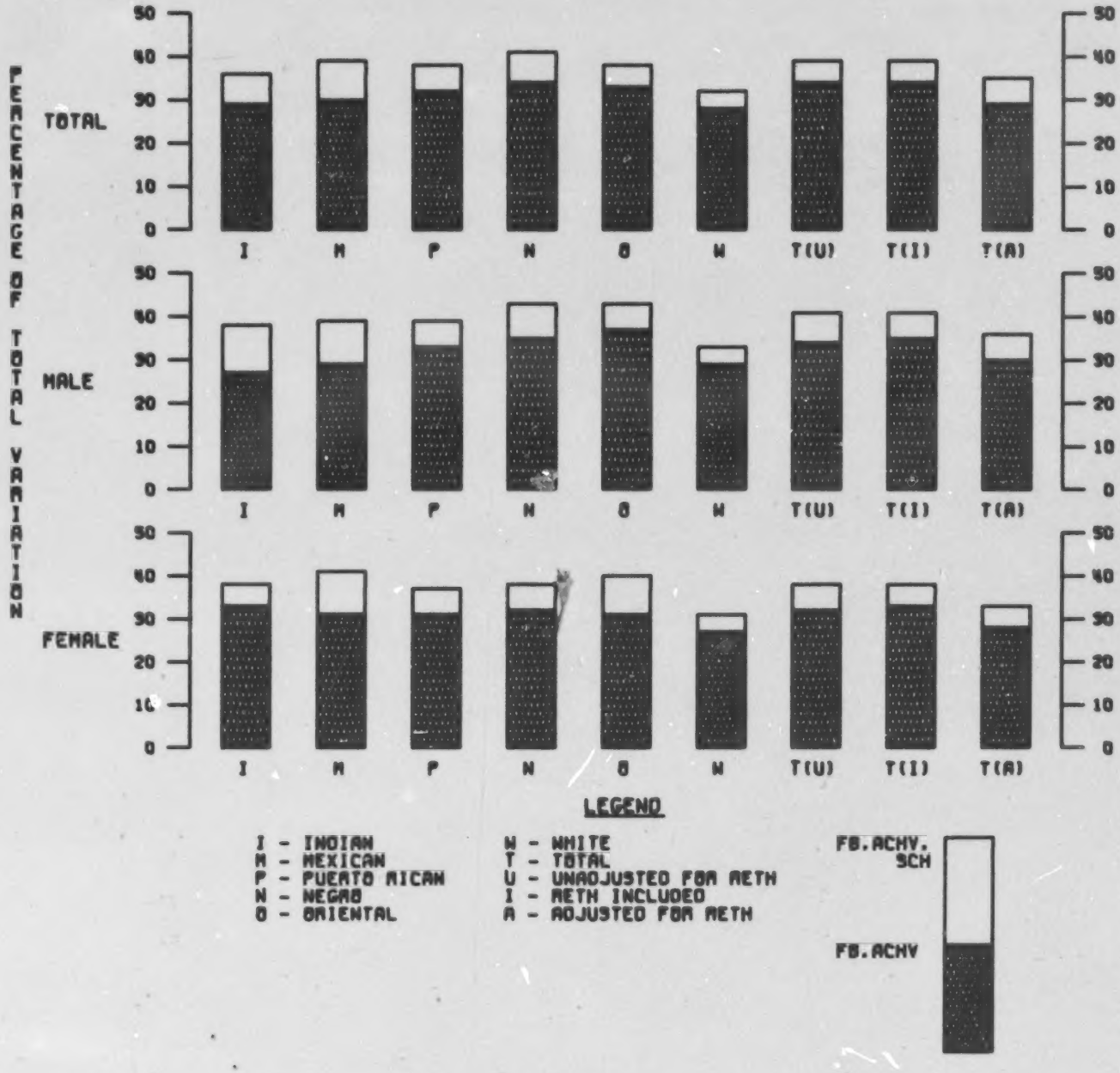
	Indian	Mexican	Puerto Rican	Negro	Oriental	White	Total U	Total I	Total A
Total	16	20	11	14	11	7	16	16	10
Male	18	20	12	17	10	8	17	17	11
Female	16	22	10	13	17	6	15	15	9

It will be seen that the variance in ATTUD associated with SCH varies from a high of 20 for Mexicans to a low of 7 for whites. Some sex differences are also apparent: male Indians, Puerto Ricans, Negroes, and whites have larger values than their female counterparts, while for Mexicans and Orientals the reverse is true. We shall need to bear in mind, then, when we compare the "unitized" results of the equation for each group, that the percentage values we are explaining are much smaller for whites than for the other groups.

Figure 5.4 presents in graphic form the results of the "unitized" analyses obtained from the equation. Comparing the results for the different groups we can note that the unique values (i.e., the double-crosshatched areas) are greater for each

[1] The "U," "I," and "A" types of analysis are explained on p. 34. The total number of 9th-grade schools included in these analyses was 923. The percentage of the total used for each separate racial-ethnic group was: Indian, 38; Mexican, 67; Puerto Rican, 35; Negro, 73; Oriental, 17; white, 73. The proportions do not sum to 100 since many students from the different groups attend the same schools. The number of 9th-grade students is the same as in table 2.1. The numbers obtained from these "total" analyses differ somewhat from those in the previous section because they are based upon some 5,000 fewer students.

FIGURE 5.3. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS, BY SEX AND RACIAL-ETHNIC GROUP MEMBERSHIP



of the individual groups than they are for the "total U" and "total I" analyses. Similarly, in the total "A" analyses the unique values increase and either approach or exceed the unique values for the separate groups. Both tendencies reflect the differences among students and schools in Attitude Toward Life (ATTUD) that are associated with Racial-Ethnic Group Membership (RETH). For example, we saw in chapters 2 and 3 that most of the groups trailed the whites in ATTUD (i.e., were less optimistic). We saw in the previous chapter that there was a high degree of relationship between the racial-ethnic composition of the school and the student body's outlook on life. These are the kinds of relationship that give rise to some of the changes that occur as the analysis moves from the separate groups to the combined or "total" groups. These same relationships give rise to the increase in the confounding of Family Background (FB), Achievement (ACHV), and SCHOOL (SCH)—i.e., the plain areas—as they relate to Attitude Toward Life (ATTUD). Such results, coupled with the fact that most whites attend school with other whites and most nonwhites attend school with other nonwhites, suggest that the most appropriate model for studying possible school influences on ATTUD may be to include all students in the same framework and consider RETH as an aspect of FB.

It is still instructive, however, to compare the similarity of the

FIGURE 5.4. - THE UNIQUE AND COMMON ROLES OF SCHOOL FACTORS IN ATTITUDE TOWARD LIFE, BY SEX AND RACIAL-ETHNIC GROUP MEMBERSHIP

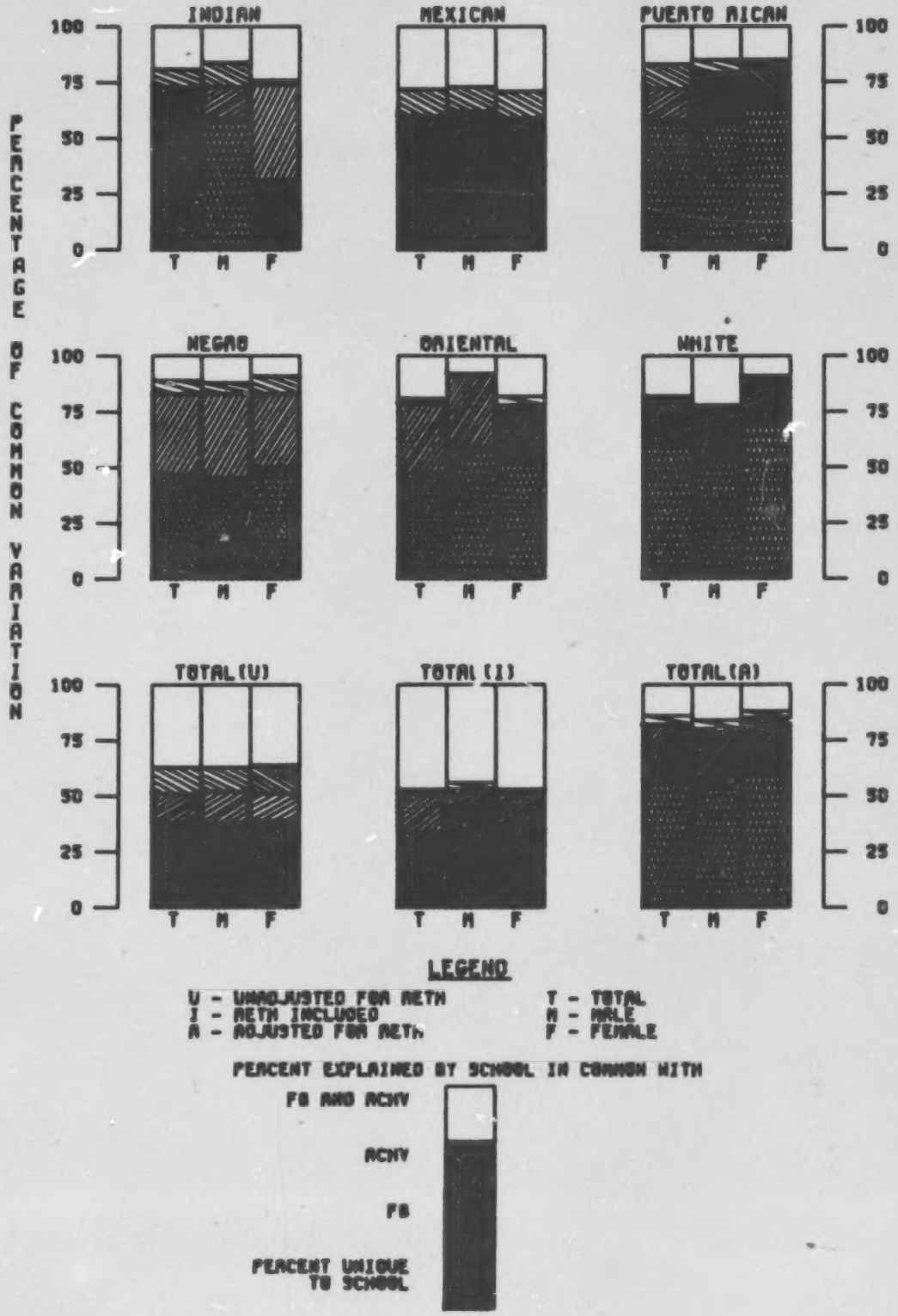


Table 5.3.—Commonality Analyses of School Outcomes (SO) and Teacher Attributes (T(5)), With Attitude Toward Life, by Sex and Racial-Ethnic Group Membership (RETH)

Racial-Ethnic Group	ADJ[1]	Total			Male			Female		
		SO Unique	T(5) Unique	Common	SO Unique	T(5) Unique	Common	SO Unique	T(5) Unique	Common
Indian	U	82	6	12	83	13	4	71	1	28
	HB	90	6	4	88	11	1	84	3	13
	HB, ACHV	95	4	1	93	7	0	84	4	12
	FB, ACHV	85	6	9	84	7	9	74	9	17
Mexican	U	57	2	41	55	2	43	58	2	40
	HB	65	3	32	65	3	32	64	3	33
	HB, ACHV	84	3	13	84	3	13	82	5	13
	FB, ACHV	76	1	22	76	2	22	74	3	23
Puerto Rican	U	49	2	49	47	7	46	50	2	48
	HB	50	3	47	50	8	42	48	2	50
	HB, ACHV	66	5	29	62	13	25	65	7	28
	FB, ACHV	42	14	44	41	27	32	41	9	50
Negro	U	96	1	4	96	0	4	95	1	4
	HB	98	1	1	97	0	3	97	1	2
	HB, ACHV	97	0	3	97	1	2	97	1	2
	FB, ACHV	98	0	2	97	1	2	98	0	2
Oriental	U	41	20	39	54	28	18	26	28	46
	HB	50	17	33	42	20	38	34	38	28
	HB, ACHV	62	16	22	61	20	19	39	35	26
	FB, ACHV	60	15	25	67	27	6	27	39	34
White	U	89	0	11	88	0	12	91	0	9
	HB	98	1	1	97	0	3	99	1	0
	HB, ACHV	99	0	1	99	0	1	99	0	1
	FB, ACHV	99	0	1	98	0	2	98	1	1
Total(U)	U	61	0	39	59	0	41	62	0	38
	HB	85	0	15	81	0	19	89	0	11
	HB, ACHV	98	0	2	96	0	4	100	0	0
	FB, ACHV	87	0	13	83	1	16	92	0	8
Total(A)	U	91	1	8	89	0	11	94	2	4
	HB	97	1	2	95	0	5	98	2	0
	HB, ACHV	99	0	1	98	0	2	99	0	1
	FB, ACHV	96	0	4	93	0	7	98	0	2

[1] "U" designates no adjustment in ATTUD; "HB" designates ATTUD adjusted for HB; "HB, ACHV," designates ATTUD adjusted for HB and ACHV; "FB, ACHV," designates ATTUD adjusted for FB and ACHV; "Total(A)" designates ATTUD adjusted for RETH; and "Total(U)" indicates that ATTUD has not been adjusted for RETH.

results for the different groups. Although the percentage values vary somewhat, we can notice certain regularities. For example, the common portion for ACHV and SCH (i.e., the portions with lines slanted from upper left to lower right) is almost always much smaller than the others. Also, for each separate group the unique portion exceeds any of the common portions. For Negroes, Orientals, Indians, and whites the portion in common with FB (i.e., the lines slanted from upper right to lower left) exceeds those of FB, ACHV, and SCH (i.e., the plain portions). For Mexicans and Indians the reverse tends to be true. Neither sex consistently has larger scores than the other for any of these measures. For the unique values, male Indians, Mexicans, and Orientals have larger values than do their female counterparts, while the reverse is true of Puerto Ricans, Negroes, and whites. Rather than attempt to interpret differences in the common portions, we shall merely note that they exist.

Our principal conclusion from these analyses is that one-third to almost two-thirds of the variance in Attitude Toward Life associated with School can be associated with such factors independently of Family Background and Achievement. To the extent that these results represent school influences they tend to be greater for female Puerto Ricans, Negroes, and whites, and for males of the other groups. It seems appropriate, then, to follow the same course as in the previous chapter and examine, for each group, the roles played by the various aspects of School as they relate to Attitude Toward Life. Accordingly, our next question is: Which one of the subsets of School, School Outcomes or T(5), plays the greater role in Attitude Toward Life for each racial-ethnic group, classified by sex?[8]

It will be seen from table 5.3 that for almost every racial-ethnic group, both male and female, and for each condition, the unique role for the set of five student body variables, School Outcomes (SO), substantially outweighs the unique role for the set of five teacher attributes, T(5). The major exception is that of Oriental females, for whom the unique roles are at times more nearly equal; indeed, for "FB, ACHV" they even favor T(5). For Mexicans, Puerto Ricans, and Orientals the common portions are quite large, whereas for Indians, Negroes, and whites they are surprisingly small. For the former groups the role of SO relative to that of T(5) and their common portion is there-

[8] As in the previous section (p. 46), "unitized" commonality analyses are given for several different conditions: "U" (before any adjustments have been made); "HB" (after Attitude Toward Life has been adjusted for Socio-Economic Status and Family Structure and Stability); "HB, ACHV" (as for "HB," except that Achievement is also included); "FB, ACHV" (as for "HB, ACHV," except that the 3 measures that make up Family Process are also included). The percentage of variance in Attitude Toward Life associated with these sets of variables for the "U" condition is given on p. 47, along with the same equation, and for the "FB, ACHV" condition is given by the plain portions in figure 5.3. The values for the other conditions, which fall between these, are not given.

Table 5.4.—Commonality Analyses of Student Body's Attitude Toward Life (SATTUD) and School Outcomes (SO(4)), With Attitude Toward Life, by Sex and Racial-Ethnic Group Membership (RETH)

Racial-Ethnic Group	ADJ[1]	Total Unique SATTUD	Total Unique SO (4)	Total Common	Male Unique SATTUD	Male Unique SO (4)	Male Common	Female Unique SATTUD	Female Unique SO (4)	Female Common
Indian	U	17	1	82	29	4	67	5	5	90
	HB	27	5	68	36	9	55	11	5	84
	HB, ACHV	26	16	58	33	16	51	13	21	66
	FB, ACHV	33	11	56	36	12	52	26	14	60
Mexican	U	27	1	72	26	1	73	26	1	73
	HB	38	3	59	37	2	61	36	3	61
	HB, ACHV	52	13	35	51	14	35	48	11	41
	FB, ACHV	61	15	24	58	12	30	59	16	25
Puerto Rican	U	19	3	78	21	5	74	15	2	83
	HB	26	4	70	29	6	65	19	3	78
	HB, ACHV	33	11	56	35	14	51	27	11	62
	FB, ACHV	28	3	69	33	7	60	22	4	74
Negro	U	32	6	62	38	4	25	25	8	67
	HB	38	12	50	44	11	45	30	16	54
	HB, ACHV	41	34	25	48	31	21	32	39	29
	FB, ACHV	61	20	19	67	22	11	51	19	30
Oriental	U	32	8	60	25	14	61	40	13	47
	HB	42	8	50	43	14	43	49	16	35
	HB, ACHV	40	7	53	39	10	51	46	22	32
	FB, ACHV	35	6	59	37	13	50	42	20	38
White	U	50	4	46	47	3	50	53	6	41
	HB	65	19	16	63	13	24	67	28	5
	HB, ACHV	60	40	0	62	32	6	55	45	0
	FB, ACHV	73	27	0	75	25	0	69	31	0
Total(U)	U	26	0	74	27	1	72	23	0	77
	HB	45	9	46	45	7	48	43	12	45
	HB, ACHV	53	35	12	55	27	18	49	43	8
	FB, ACHV	64	19	17	62	16	22	64	22	14
Total(A)	U	40	3	57	41	3	56	37	5	58
	HB	52	13	35	53	10	37	49	17	34
	HB, ACHV	54	31	15	56	26	18	49	38	13
	FB, ACHV	70	21	9	69	19	12	68	24	8

[1] "U" designates no adjustment in ATTUD; "HB" designates ATTUD adjusted for HB; "HB, ACHV," designates ATTUD adjusted for HB and ACHV; "FB, ACHV," designates ATTUD adjusted for FB and ACHV; "Total(A)" designates ATTUD adjusted for RETH; and "Total(U)" indicates that ATTUD has not been adjusted for RETH.

fore overwhelmingly large. For the latter groups, however, their common portion is large enough to indicate that T(5) may be manifesting an influence either through or in conjunction with SO. Overall, however, we are inclined to regard the SO set as being the key to understanding the possible effect of SCH factors on ATTUD.

These results lead to our next question, which is: Which aspect of School Outcomes, Student Body's Attitude Toward Life, or SO(4) plays the greater role in Attitude Toward Life? It will be remembered that SO(4) consists of the four student body variables of Expectations for Excellence, Educational Plans and Desires, Study Habits, and Achievement. The results of our "unitized" commonality analyses for these two sets of variables, under the same conditions as before, are given in table 5.4. These results show that for almost all of the groups and conditions the unique role of Student Body's Attitude Toward Life (SATTUD) exceeds that of SO(4). The main exception is that of Negro females, for whom, under the "HB, ACHV" condition, the role of SO(4) slightly exceeds that of SATTUD. For groups other than whites, the role of SO(4) and its portion in common with SATTUD is large enough to indicate that SO(4) also plays a role, even though most of it is common with SATTUD. For whites, however, much of the role of SO(4) is unique. We shall conclude, then, that Student Body's Attitude Toward Life plays the greatest role among the possible influences of School on Attitude Toward Life, but that the role of SO(4) is also considerable.

Having examined these results we may wonder how these same analyses vary for the different racial-ethnic groups by region. This question is taken up in the next section.

5.3. VARIATIONS IN ATTITUDE TOWARD LIFE BY FAMILY BACKGROUND, ACHIEVEMENT, SCHOOL, GEOGRAPHIC LOCALE, AND RACIAL-ETHNIC GROUP MEMBERSHIP

In this section we shall pose the same kinds of question as in the previous section. The difference is that we shall be interested in how the results for students in the North compare with those for students in the South.[9] We are interested in these compari-

[9] For the States used in these groupings, see p. 6. The number of schools used in these analyses was 923. For each separate racial-ethnic group the proportions were:

	I	M	P	N	W	Total
North	24	31	18	29	42	45
South	14	37	17	44	31	55

These proportions do not sum to their regional total because many of the minority group students attend the same schools.

sons because of the light they may shed on the possible effects of school organization and school influences on Attitude Toward Life for the separate racial-ethnic groups. In order to keep down the number of comparisons to be made we did not examine sex differences. Also, because Oriental-Americans were divided between East and West rather than North and South, we omitted them from the analysis.

We first inquired into the similarities and differences in the relationship of Family Background, Achievement, and School for the North as compared with the South. The percentage of variation in Attitude Toward Life associated with these variables is shown for both regions in figure 5.5. The emphasis here should be upon the plain portions, which represent the possible effects of School that are independent of Family Background and Achievement. Except for Indians, for whom just the reverse is true, these plain portions are greater in the South than in the North. Differences in the magnitude of the plain portions are not pronounced. What *is* pronounced is the large difference in the total R-square (i.e., the shaded and plain portion combined) between South and North, especially for Mexicans and Puerto Ricans.

We turn now to the manner in which the variance in Attitude Toward Life associated with our set of 10 School variables is apportioned between Family Background and Achievement, and the portion that can be uniquely attributed to School. As in the previous section, we shall divide the equation by R^2(SCH) so as to make the values comparable across groups. These values are:

	Indian	Mexican	Puerto Rican	Negro	White
North	16	11	9	11	6
South	17	29	25	18	9

It will be seen that the percentage of variation in Attitude Toward Life associated with School is always greater in the South than in the North, and that this difference is especially pronounced for Mexican-Americans, Puerto Ricans, and Negroes.

Figure 5.6 presents in graphic form, the results of these "unitized" analyses. There are some conspicuous regional differences here in the percentage values for the different groups. For Indians, Mexicans, and Puerto Ricans relatively more of the variance in Attitude Toward Life (ATTUD) associated with School (SCH) is confounded with Family Background (FB) and

FIGURE 5.5. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS, BY RACIAL-ETHNIC GROUP MEMBERSHIP, FOR NORTH AND SOUTH

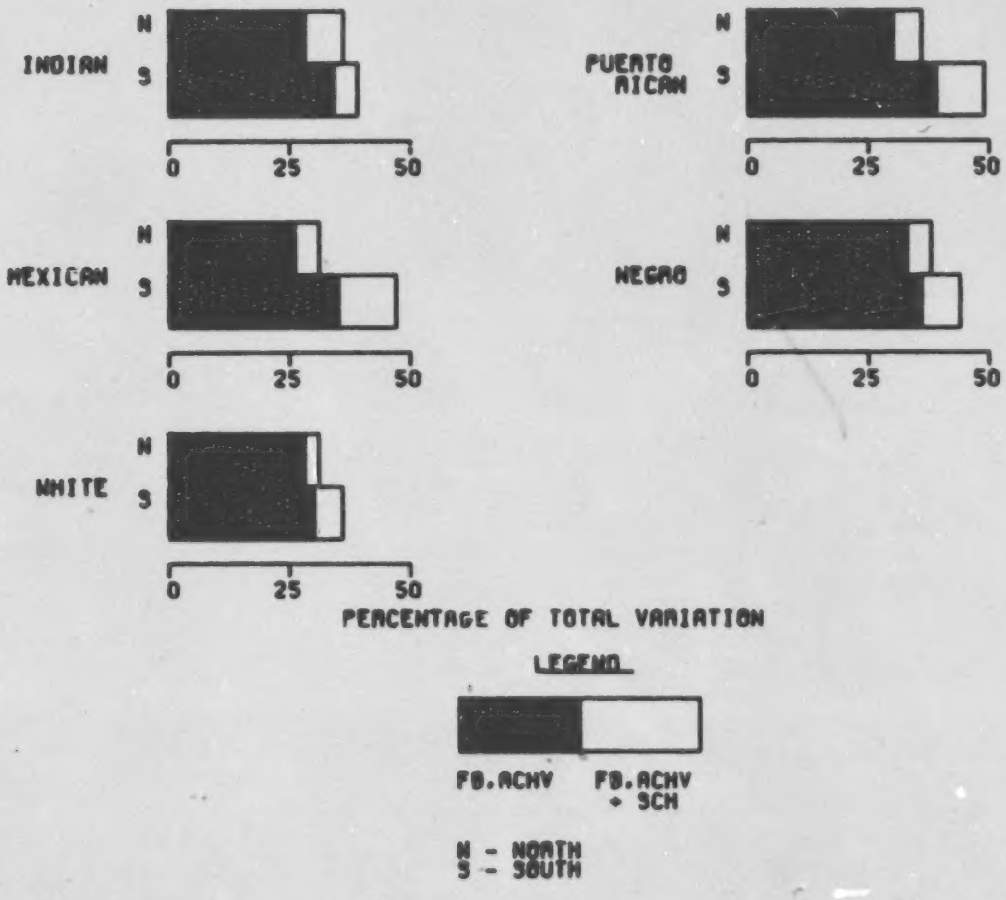
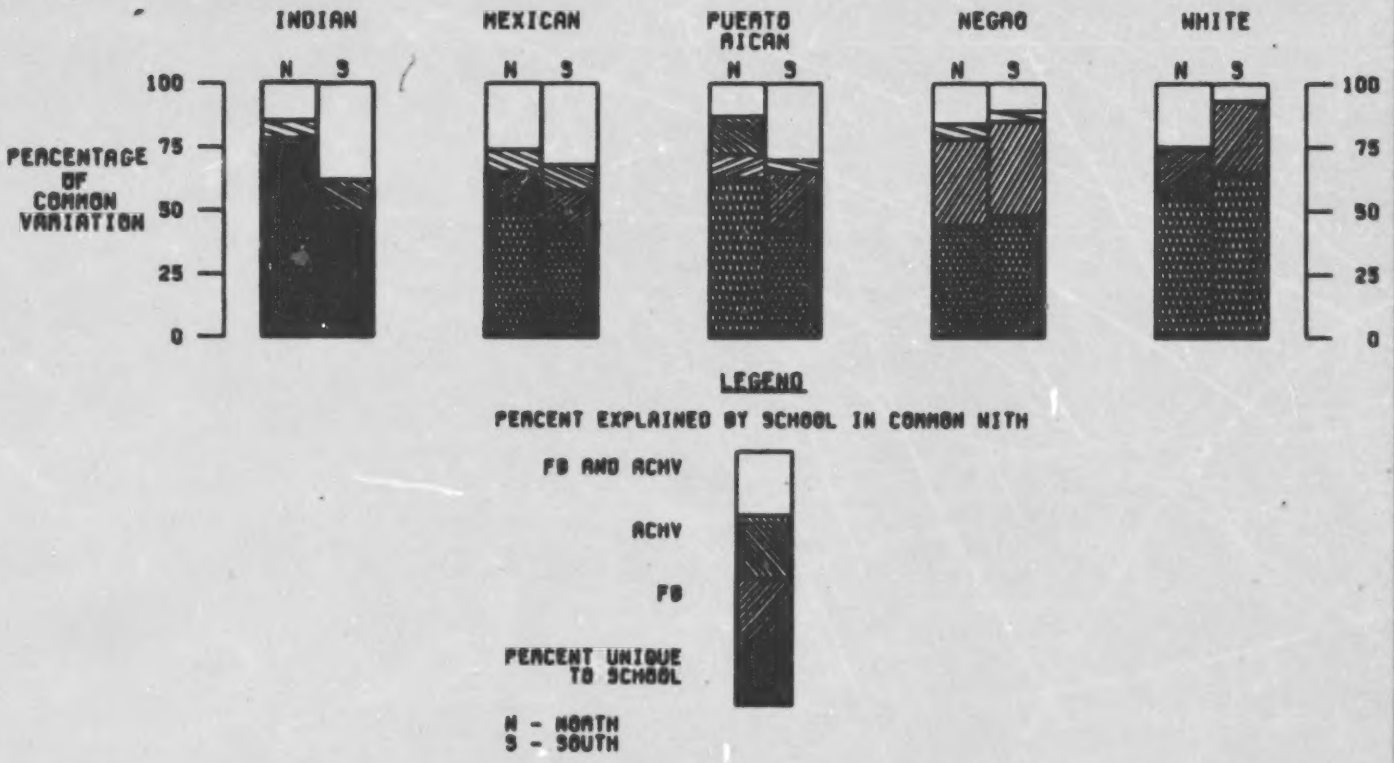


FIGURE 5.6. - THE UNIQUE AND COMMON ROLES OF SCHOOL FACTORS IN ATTITUDE TOWARD LIFE, BY RACIAL-ETHNIC GROUP MEMBERSHIP, FOR NORTH AND SOUTH



Achievement (ACHV) in the South than in the North. For Negroes and whites, however, this confounding is greater in the North than in the South. For Indians, Mexicans, and Puerto Ricans most of these differences appear in the form of smaller unique values for the set of school factors in the South. The same groups display a larger confounding of FB and ACHV in the South, as can be seen from the plain portions in figure 5.6. Also, Indians in the North and Puerto Ricans in the South have a greater confounding of FB with SCH in relation to ATTUD than do their southern and northern counterparts. The regional values for Negroes are more similar than for the other groups. They do differ, however, to the extent that the common portions for FB and ACHV (i.e., the plain portions) and for ACHV (i.e., the portions with lines slanted from upper left to lower right) are greater in the North than in the South. The unique value and portion in common with FB also tend to be greater in the South. Curiously, the same kind of trend exists for whites as for Negroes, although for whites the regional differences tend to be more pronounced.

We are now in a better position to appreciate how Family Background (FB), Achievement (ACHV), and School (SCH) are confounded in their relationship with Attitude Toward Life (ATTUD). For most groups, the confounding of SCH is greatest with FB and FB-ACHV; seldom is the confounding of SCH with ACHV very large. Another point worthy of note is that, for most of the groups, about half of the variance in ATTUD associated with SCH can be uniquely explained by it.

Our next step, then, is to find out which aspects of the school factors set are playing a greater role in some regions rather than others. Accordingly, we shall ask: Which aspects of School, School Outcomes or T(5), are playing the greatest role in Attitude Toward Life?[10] Our analyses, unlike those in previous sections, will deal with only one condition; viz, when Attitude Toward Life has first been adjusted for Family Background and Achievement. The percentage of variance in Attitude Toward Life that we will be working with corresponds to the plain portions in figure 5.5.

The results of unitized analyses for School Outcomes (SO) and T(5) are given in table 5.5. It will be seen that there are some marked regional differences for some of the groups. Thus for Indians and Mexicans the unique roles of SO and T(5) are greater in the North than in the South, while their common portion is greater in the South. For Puerto Ricans the common portions for North and South tend to be close in magnitude, while the unique role of SO is greater in the South than in the North and the unique role of T(5) is greater in the North. The results for Negroes and whites differ from those for the groups just mentioned primarily in that the roles for SO are much larger and those for T(5) and the common portion are much smaller. For Negroes the role of SO is greatest in the South; the common portion and the unique role of T(5), on the other hand, are greatest in the North. The unique role of T(5) is zero for whites of both regions, but the unique role of SO is larger in the North and that of the common portion is larger in the South. Clearly, for all groups the unique role of T(5) is smallest by far in the South. Neither the common portions nor the unique role for

[10] For the variables that make up School Outcomes and T(5), see p. 46.

Table 5.5.—Commonality Analyses of School Outcomes (SO) and Teacher Attributes (T(5)), With Attitude Toward Life, by Racial-Ethnic Group Membership, for North (N) and South (S)

Racial-Ethnic Group	Region	Unique SO	Unique T(5)	Common
Indian	N	90	7	3
	S	72	3	25
Mexican	N	74	7	19
	S	64	5	31
Puerto Rican	N	38	19	43
	S	49	6	45
Negro	N	86	2	12
	S	98	0	2
White	N	99	0	1
	S	91	0	9

SO are uniformly greater in one region than in another; rather, the values depend in each case upon the group under consideration. For all groups, however, the unique role of SO exceeds that of T(5) by a sufficient amount for us to conclude that SO is the set to focus on. For groups other than Negroes and whites we would also be inclined to conclude, from the values shown here, that the T(5) set may play a secondary role.

Accordingly, our next question is: Which aspect of School Outcomes, Student Body's Attitude Toward Life or SO(4), is playing the greater role in Attitude Toward Life? The results of "unitized" commonality analyses for these two subsets of School Outcomes, after adjustments in Attitude Toward Life were first made for Family Background and Achievement, are given in table 5.6. It will be seen from this table that there are considerable regional as well as group differences. One that stands out immediately is that the common portions are virtually zero for whites and next largest for Negroes; indeed, the values for the other groups usually exceed those for both whites and Negroes by a considerable amount. Moreover, the unique role of Student Body's Attitude Toward Life tends to be greater in the South than in the North for whites, Negroes, and Indians, although for these same groups the role of SO(4) is greater in the North than in the South. For Mexican-Americans and Puerto Ricans the unique roles of both sets are greater in the North than in the South, while their common portions are smaller in the North. For each group the role of Student Body's Attitude Toward Life exceeds that of SO(4) by a sufficient amount for us to conclude that it is the variable to concentrate on in trying to understand school influences on ATTUD.[11] However, SO(4) clearly plays a role as well. We will withhold further interpretation of these differences until we can pull together the results from the different sections.

Table 5.6.—Commonality Analyses of Student Body's Attitude Toward Life (SATTUD) and School Outcomes (SO(4)), With Attitude Toward Life, by Racial-Ethnic Group Membership, for North (N) and South (S)

Racial-Ethnic Group	Region	Unique SATTUD	Unique SO(4)	Common
Indian	N	34	14	52
	S	48	9	43
Mexican	N	64	21	15
	S	54	12	34
Puerto Rican	N	33	7	60
	S	21	5	74
Negro	N	54	26	20
	S	60	17	23
White	N	68	32	0
	S	76	23	1

[11] For the variables that make up Student Body's Attitude Toward Life and SO(4), see p. 5.

5.4. COMMONALITY ANALYSES OF HOME BACKGROUND, FAMILY PROCESS, ACHIEVEMENT, AND SCHOOL WITH ATTITUDE TOWARD LIFE

How do the sets of variables already discussed relate to one another when placed in a more complex analysis? Although such an analysis would become unwieldy for each separate group, it can be performed easily enough for all students combined. In particular, it seems worth examining the relative roles played in Attitude Toward Life by Home Background, Achievement, Family Process, and School when placed in context with one another. In order to do this we shall use two versions of Home Background, one consisting only of Socio-Economic Status and Family Structure and Stability, and the other of these variables plus Racial-Ethnic Group Membership (RETH). We shall label the former set "HB" and the latter "HB(I)." In table 5.7, which contains the results of four-set commonality analyses for these variables, the coefficients for each set for the HB and HB(I) analyses are placed alongside one another, in order to more readily display the changes that take place when RETH is included as an aspect of HB.

It will be seen that the squared multiple correlations, R-SQ(T), both before and after RETH is included, are the same. Hence 44 percent of all the differences among students in their ATTUD are explained by these four sets of variables whether or not RETH is included. The values of the unitized coefficients in the body of the table show that the inclusion of RETH as an aspect of HB has only a slight effect, most of which consists in a small increase in the third-order coefficient involving Home Background, Achievement, and School, and a small decrease in the second-order coefficient involving Achievement and School. For the remainder of this discussion, then, we will emphasize the considerable regularities for these two analyses (viz, HB and HB(I)).

In examining the row labeled "Sum %," which is obtained by summing the coefficients in each column, we can note that the largest value by far occurs for Family Process (PRCS). The values for the other sets, which are some 24 to 40 percent less, are highest for Achievement (ACHV) and lowest for the 10-

Table 5.7.—Commonality Analyses of Home Background (HB), Achievement (ACHV), Family Process (PRCS), and School (SCH(10)), With Attitude Toward Life

	1 HB	1 HB(I)	2 ACHV		3 PRCS		4 SCH(10)	
U(Xi)	0	0	5	5	22	22	12	11
C(X1X2)	0	1	0	1	---	---	---	---
C(X1X3)	8	8	---	---	8	8	---	---
C(X1X4)	0	1	---	---	---	---	0	1
C(X2X3)	---	---	12	12	12	12	---	---
C(X2X4)	---	---	4	1	---	---	4	1
C(X3X4)	---	---	---	---	4	5	4	5
C(X1X2X3)	15	15	15	15	15	15	---	---
C(X1X2X4)	2	5	2	5	---	---	2	5
C(X1X3X4)	2	1	---	---	2	1	2	1
C(X2X3X4)	---	---	−1	−1	−1	−1	−1	−1
C(X1X2X3X4)	14	14	14	14	14	14	14	14
Sum %	41	45	51	52	76	76	37	37
R-SQ(T)	---	---	---	---	44	44	---	---

NOTE.—HB consists of SES and FSS; HB(I) designates HB when it includes RETH. The total number of 9th-grade students is 133,136, from 923 schools.

variable school set (SCH(10)), with Home Background (HB) in the middle. This ordering changes somewhat for the unique values: PRCS still has a much larger unique value than the others, but SCH(10) takes on the second largest value, and ACHV is third. HB is lowest of all with a zero value.

Another significant ordering that can be obtained from this table is based on the difference between the value for "Sum %" and that of the unique value, U(Xi). This difference is an index of the variance in Attitude Toward Life explained by that particular set that is confounded with the other sets. Here, the value is greatest for PRCS (54 percent), next greatest for ACHV (47 percent), third greatest for HB (45 percent), and lowest for SCH (25 percent). These results show that PRCS explains more of the variance in ATTUD than any of the other sets, and has both the largest unique value and a larger percentage confounded than any of the other sets.

Another crucial test is to examine the higher order coefficients. Here, a large portion—some 14 percent—is confounded among all four sets (C(X1X2X3X4)). Other large portions involve HB, ACHV, and PRCS (C(X1X2X3)), HB and ACHV (C(X1X3)), and ACHV and PRCS (C(X2X3)). Curiously, the magnitude of these coefficients for SCH(10), other than the fourth-order one, are not nearly as large as they are for the other sets. Hence, much of the confounding for this set occurs with all of the other sets of variables. Some confounding of SCH(10) also occurs with PRCS (C(X3X4)), and with HB and ACHV (C(X1X2X4)).

In summary, these analyses have shown that the largest explanatory role (both total and unique) in Attitude Toward Life of any of these variables, when put in context with Home Background, Achievement, and School, is played by Family Process. The second largest unique value, which was almost half that of Family Process, belonged to School, and the third largest, which was about one-fourth that of Family Process, to Achievement. The unique value of Home Background was zero. We conclude, then, that the personalized kinds of parent-child involvement represented by Family Process persist in their relationship with Attitude Toward Life even after Home Background, Achievement, and School have been taken into account. In addition, the school set plays a discernible role in which previous analyses have suggested that the student body's achievement and motivational mix plays the primary role.

5.5. SUMMARY

In this chapter we examined the role that school factors played in Attitude Toward Life, both alone and in combination with Family Background and Achievement. On the basis of previous analyses we selected a set of 10 school factors, called SCH or SCH(10), that were shown to account for most of the variation in an individual student's Attitude Toward Life insofar as it was associated with school factors. This was true both before and after different aspects of his Family Background and Achievement were taken into account.

The set of 10 school factors contained 2 main subsets of 5 variables each. The first consisted of student body's Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement. This subset was called School Outcomes (SO) because it represented, in part, the aggregate effect of the school. The second subset consisted of five attributes of teachers: racial-ethnic composition; level of verbal skill; view of teaching conditions; preference for working with students of different ability levels; and salary and training. This subset was labeled "T(5)."

We began by asking various questions about the role of school factors, but our chief interest was in the percentage of Attitude Toward Life that could be associated with these factors before any aspects of the student's Family Background or Achievement had been taken into account. We examined these percentages for students grouped in a number of different ways.[12] When all the racial-ethnic groups of both sexes were kept in the same analytic framework, a value of 16 percent was observed. When the groups were kept separate, however, we noted that this percentage varied considerably. It was usually lower for whites than for the other groups, a result that indicates in part the more pronounced tendency of nonwhite than of white students to go to school with others who are similar to themselves in outlook.

Some of this relationship may also indicate the possible effects of school factors on Attitude Toward Life. However, we saw in chapter 3 that nonwhites have a less optimistic outlook on life than whites, and in chapter 4 that both nonwhites and whites tend to go to school with students of similar background.[13] In view of these facts we have chosen here to give primary emphasis to the results for analyses in which all students are included in the same framework. In this manner the full range of Attitude Toward Life as well as other school factors can be entered into the analysis. In addition, since so many things are associated with Racial-Ethnic Group Membership we shall emphasize results in which it is included as an aspect of Family Background.

The first question we asked was: How is the variation in Attitude Toward Life (ATTUD) that is associated with school factors (SCH) apportioned between Family Background (FB) and Achievement (ACHV), and how much can be uniquely associated with SCH, independently of FB and ACHV? We noted earlier that the percentage of variation in ATTUD associated with SCH was 16 percent for all ninth-grade students. When these same percentages were examined for the different regions we observed the following values: nonmetropolitan North, 10; metropolitan North, 13; metropolitan South, 20; and nonmetropolitan South, 23—percentages almost twice as great in the South as in the North.[14] After the student's FB[15] and ACHV were taken into account, these regional percentages declined as follows: nonmetropolitan North, 3; metropolitan North, 3; metropolitan South, 7; nonmetropolitan South, 6. Again these values, although much smaller, were about twice as great in the South as in the North. Hence, what we would regard as the possible effects of school factors on ATTUD that were independent of FB and ACHV were greater in the South than in the North. We shall suggest a possible explanation for this a little later.

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[12] Actually, the percentages in question were squared multiple correlations.

[13] In chapter 5 this was indicated by the high correlations of the student body's racial-ethnic and socioeconomic composition with that of the student's own group membership.

[14] North-South differences were examined for the separate racial-ethnic groups. These percentages were found to be greater in the South than in the North. This regional difference was particularly pronounced for Mexicans, Puerto Ricans, and Negroes. Sex differences tended to be greater for males than for females, except for Mexicans and Orientals, for whom the reverse was true.

[15] Including his Racial-Ethnic Group Membership.

When we examined the variance in ATTUD associated with SCH that was confounded with FB and ACHV, we observed that for all regional groups the shared percentages were greatest for FB and SCH, and for the combination of FB, ACHV, and SCH. The common portion for ACHV and SCH was usually very much smaller relative to these other values (viz, FB-SCH, and FB-ACHV-SCH).[16] Hence, insofar as these common portions represent the shared or joint roles of FB, ACHV, and SCH factors as they relate to ATTUD, they suggest that these roles are exercised through FB and through FB-ACHV combined, rather than just through ACHV.

The next question we asked was: Which subsets of the School set, School Outcomes or T(5), appear to be playing the greater role in Attitude Toward Life? We conducted these analyses both before and after Attitude Toward Life was adjusted for increasingly more aspects of the student's Family Background (including his Racial-Ethnic Group Membership), as well as of his Achievement. These analyses showed that, for all these conditions, the set of five student body variables (SO) played an overwhelmingly greater role than did the set of five teacher attributes (T(5)). Indeed, insofar as T(5) played a role at all, it was almost completely confounded with SO.[17] Regional differences in these relationships were not marked.[18]

We then asked: Which of the five student body variables (SO) seem to be playing the greatest role in Attitude Toward Life? In order to conduct these analyses we separated these variables into two sets: Student Body's Attitude Toward Life (SATTUD), and a set containing the other four student body variables (SO(4)). Analyses with these sets were run both before and after Attitude Toward Life (ATTUD) was adjusted for increasingly more aspects of the student's Family Background (including his Racial-Ethnic Group Membership) and for his Achievement. These analyses showed that the role of SATTUD exceeded that of SO(4) by an amount large enough to show that it was definitely the more important of the two. However, the role of SO(4) was far from negligible. We concluded, then, that SO, which may be thought of as the achievement and motivational mix of the student body, is the key to understanding the effects of school factors on ATTUD.[19] The regional figures showed that the role of SATTUD was slightly greater in the South than in the North, while the opposite was true of SO(4).[20]

What kind of explanatory model is most suited to these data? We are inclined to rely on a modified version of an earlier formulation (Mayeske et al., 1972a). This version runs as follows:

1. Students are allocated into schools on the basis of Family Background (FB), primarily their Socio-Economic Status (SES) and Racial-Ethnic Group Membership (RETH).
2. Since attributes such as Attitude Toward Life (ATTUD) and Achievement (ACHV) are correlated with FB, it follows that there is considerable disparity among schools in the composition of their students not only with regard to the primary assignment variables, such as SES and RETH, but also with regard to variables correlated with them, such as ATTUD and ACHV.
3. It follows that the student mix of behavioral attributes has an effect on each individual student that is *independent* of his FB—and, in the case of ATTUD, independent of his ACHV as well.[21] Since the allocation of students into schools on the basis of their SES and RETH is more pronounced in the South than in the North, and since the relationship of FB with ATTUD is also more pronounced there (see chapters 3 and 4), we would expect that the effect of one's fellow students' behavioral attributes would also be greater there.

In our earlier work we were able to assert that disparities among students and schools in Achievement were already evident at the first grade, and that the schools tended to perpetuate these differences among the racial-ethnic groups. For Attitude Toward Life, unfortunately, we do not have a measure at the first grade, and hence are unable to assert to what extent disparities in this variable are present and to what extent they are perpetuated or increased over the years of schooling. This latter topic will be dealt with at greater length in chapter 6.

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[16] This tended also to be true for each of the separate racial-ethnic groups, the main exception being Puerto Rican females.

[17] For some of the separate racial-ethnic groups, T(5) tended to have a larger unique and common role than for all groups combined. However, except for Oriental-Americans, this unique role was never large.

[18] For groups other than whites, the unique role of T(5) was slightly greater in the North than in the South, while for the role of SO the opposite was true. For all groups, however, the role of SO was overwhelmingly greater than that of T(5).

[19] This also tended to be true for each of the separate racial-ethnic groups.

[20] The same pattern held good for northern as opposed to southern Indians, Negroes, and whites. For Mexicans and Puerto Ricans, however, the unique role for both sets was greater in the North than in the South.

[21] However, the independent effect of the student body's attitudes and behavior is small compared with that of the student's own family background.

6. Grade-Level Trends

So far we have dealt mainly with results at the ninth grade. We shall now go on to compare them with results at the 6th and 12th grade. We did not use results from the lower grades because an adequate set of family process measures was not available at those levels. Even at the sixth grade none of the variables was as adequately measured as at the higher grades. However, for grades 9 and 12 the measures were entirely comparable.

We shall make comparisons of four main kinds: comparisons of one variable's correlation with another; comparisons of percentages of variation, or R-squares; comparisons of the results of commonality analyses; and comparisons of simple group differences, whether expressed in the form of ranks, mean differences, or sigma differences.

Table 6.1 shows, for each locale, the percentage of students from each grade level included in the analyses. It will be seen that the largest proportions of students and schools are from the metropolitan North and nonmetropolitan South. Table 6.2 shows the corresponding percentages for each racial-ethnic group, with the percentage of male students. This latter table suggests that we take two precautions in inferring grade-level trends. The first one pertains to the increasing percentage of white and Oriental-American students at the higher grade levels and the decreasing percentages for the other groups. These changes indicate the proportionately greater incidence of dropouts among Indians, Mexican-Americans, Puerto Ricans, and Negroes than among Oriental-Americans and whites. Hence, the populations at the higher grade levels are more selective not only in terms of the propensity to attend school but in terms of all variables correlated with that propensity. The other precaution is made necessary by the slightly greater proportion of males than females, among Indians, Mexican-Americans, Puerto Ricans, and Oriental-Americans, as represented in table 6.2. Evidently, for these groups, there was underreporting among females, some of whom must have either identified themselves as "other" on the racial-ethnic question or failed to respond to that item at all. In addition, a higher proportion of females than males may well have declined to identify themselves by sex. Such, at any rate, is the conclusion suggested by the relevant figures for ninth-grade students, 50.6 percent of whom identified themselves as male and 48.2 percent as female, while 1.2 percent failed to respond to that item.

6.1. GRADE-LEVEL TRENDS IN GROUP DIFFERENCES

In chapter 2 we examined the ranked means for each group on each of the five family background variables (FB) and on Achievement (ACHV). We noted that there was a pronounced tendency for a group that ranked high on one variable to rank high on all the others as well. We also noted that there was a high degree of correlation among these ranks, as could be seen from the percentage of total variance accounted for by the first principal component computed on the intercorrelations of these ranks. It is now time to inquire if these same kinds of relationship prevail for the other grade levels.

The ranked group means for each grade level are shown in table 6.3. It will be seen that, with only a few exceptions, groups that are high for one grade level tend also to be high for the others. This is true of almost every variable. Thus, whites tend to score highest at every grade level on every variable except for Expectations for Excellence at the 12th grade and Educational Plans and Desires at the 9th grade. Similarly, Orientals tend to score second highest, with the exception of Educational Plans and Desires at the 12th and 9th grades, Study Habits at the 12th grade, and Attitude Toward Life as well as Expectations for Excellence at the 6th grade. Puerto Ricans tend to score lowest, with the next-to-lowest being a toss up between Indians and Mexicans. Negroes show the greatest shift over the grade levels, as their relative Socio-Economic Status, Family Structure and Stability, Attitude Toward Life, and Achievement all decline, while their Expectations for Excellence, Educational Plans and Desires, and Study Habits increase. No doubt some of these changes are due to the higher dropout rates for Indians and Mexican-Americans, as well as to the characteristics of

Table 6.1.—Percentage of Total Students (P_N) and Percentage of Total Schools (P_s), by Geographic Locale, Grade Level, and Region

Region	Grade	NonMetropolitan P_N	NonMetropolitan P_s	Metropolitan P_N	Metropolitan P_s	Total P_N	Total P_s
North	12	12%	19%	51%	20%	63%	39%
	9	12%	17%	51%	27%	62%	44%
	6	13%	18%	45%	34%	58%	52%
South	12	24%	50%	12%	11%	37%	61%
	9	25%	44%	13%	11%	38%	55%
	6	29%	37%	14%	11%	42%	48%
Total	12	37%	69%	63%	31%	96,426	780
	9	36%	62%	64%	38%	133,136	923
	6	41%	55%	59%	45%	123,306	2,370

NOTE.—Because of rounding, percentages may not add to 100.

Table 6.2.—Percentage of Students and Schools, With Percentage of Male Students, by Racial-Ethnic Group Membership and Grade Level

Racial-Ethnic Group	All Students at Grade: 6	9	12	Male Students at Grade: 6	9	12	Schools at Grade: 6	9	12
Indian	3%	2%	2%	55%	54%	55%	31%	38%	27%
Mexican	7%	5%	3%	58%	58%	54%	53%	67%	49%
Puerto Rican	3%	3%	2%	58%	51%	50%	29%	35%	23%
Negro	28%	29%	26%	47%	48%	46%	55%	73%	67%
Oriental	1%	1%	2%	56%	52%	54%	12%	17%	12%
White	57%	60%	66%	51%	51%	50%	77%	73%	66%
Total	118,106	128,106	94,096	51%	51%	49%	2,370	923	780

NOTE.—Because of rounding, percentages for students may not add to 100. Percentages for schools are not meant to add to 100, since many students from different groups attend the same school.

dropouts in every racial-ethnic group. Undoubtedly, also, some of these changes reflect group characteristics, such as higher Expectations for Excellence for Negroes who remain in school.

We may develop two quantitative measures of the stability of these ranks over the grade levels. One measure focuses on the extent to which, at each grade level, a group that is high on one variable, as indicated by its rank, tends also to be high on each of the other variables at that grade level. This degree of correlation is assessed in the same manner as in chapter 2, by computing the percentage of total variance accounted for by the first few principal components of the intercorrelations. If this percentage is high for the first principal component, then there is a pronounced tendency for groups that are high on one variable to be high on all the others. However, if more than one principal component is required to account for these intercorrelations then there must be subgroups of variables on which certain groups rank high and others on which they rank low. The percentage of variance accounted for by the first few principal components at each grade level is as follows:

Percentage of Variance:	Grade Level 6th	9th	12th
First	93	89	71
Second	4	4	23
Third			4

These percentages show that at each grade level there is a strong first principal component that accounts for most of the variance among these ranks. It will also be seen that the percentage of variance accounted for by this component decreases at the higher grade levels. Indeed, at the 12th grade a second principal component emerges that accounts for 23 percent of the variance. This is undoubtedly due in part to changes among the groups in their relative Expectations for Excellence as well as their Educational Plans and Desires.

Of special importance here is the correlation between a group's relative Achievement (ACHV) and Attitude Toward Life (ATTUD) at each grade level. It is important because the variable we are using to indicate racial-ethnic group membership was created by assigning to each student the mean achievement score attained by members of his racial-ethnic group (p. 12). But if the group differences in Achievement are about the same as they are in Attitude Toward Life, then Racial-Ethnic Group Membership can also be used to explain group differences in the latter. The relevant correlations for grades 6, 9, and 12 are, respectively, 83, 94, and 94. These values are large enough to indicate that Racial-Ethnic Group Membership can indeed be used to explain differences in Attitude Toward Life.

A second quantitative measure we can develop is of the stability of the group ranks for each variable across grade levels. This is done by computing the correlations of the group ranks for each variable at each grade level. For example, the ranks for Socio-Economic Status at grade six are correlated with their counterparts at grade nine to get a measure of the relative stability of the group means as the analysis moves from the lower grade to the higher. If the correlation is high (i.e., near unity), then the relative standing of the groups remains the same. The lower the degree of correlation the greater are the changes or fluctuations among groups and across grade levels. These correlations, for each variable, are given in table 6.4. If a correlational value of 80 indicates a high degree of stability then, as can be seen from the table, there is moderate-to-high stability in the relative standing of these groups on Achievement (ACHV), Study Habits (HBTS), Educational Plans and Desires (EDPLN), Socio-

Table 6.3.—Rank Order of Racial-Ethnic Group Differences on Family Background, Attitude Toward Life, and Achievement, by Grade Level

Set of Variables	Indian 6	9	12	Mexican 6	9	12	Puerto Rican 6	9	12	Negro 6	9	12	Oriental 6	9	12	White 6	9	12
Socio-Economic Status (SES)	5	5	3	4	3	5	6	6	6	3	4	4	2	2	2	1	1	1
Family Structure and Stability (FSS)	5	5	4	4	3	3	6	6	6	3	4	5	2	2	2	1	1	1
Expectations for Excellence (EXPTN)	4	5	4	5	4	6	6	6	5	2	3	1	3	2	2	1	1	3
Attitude Toward Life (ATTUD)	4	4	3	5	3	4	6	6	6	2	5	5	3	2	2	1	1	1
Educational Plans and Desires (EDPLN)	4	4	3	5	5	5	6	6	6	3	3	2	2	1	4	1	2	1
Study Habits (HBTS)	4	5	4	5	4	5	6	6	6	3	3	2	2	2	3	1	1	1
Achievement (ACHV)	3	3	3	5	4	4	6	6	5	4	5	6	2	2	2	1	1	1

NOTE.—A low rank indicates a high mean. Family Background consists of all the row variables except ATTUD and ACHV.

Table 6.4.—Rank-Order Correlations of Group Differences on Family Background, Attitude Toward Life, and Achievement for Grades 6, 9, and 12

Grade Level	Rank-Order Correlations						
	SES	FSS	EXPTN	ATTUD	EDPLN	HBTS	ACHV
6 and 9	94	94	89	60	94	94	94
9 and 12	77	94	60	94	66	89	94
6 and 12	83	83	77	66	83	94	83

NOTE.—For the full titles of the variables here denoted by acronyms, see table 6.3.

Economic Status (SES), and Family Structure and Stability (FSS). There is somewhat less stability for Expectations for Excellence and for Attitude Toward Life. We can expect these relationships to affect the results of later analyses.

Still another way of observing these changes is to inspect the magnitude of the correlates of Racial-Ethnic Group Membership (RETH) at each grade level. It is clear from tables 6.3 and 6.4 that group means of Achievement (the basis, it will be recalled, of RETH), are highly stable over the grade levels. Consequently, we would expect correlates of RETH at each level to reflect, in large measure, changes in the group means on the other variables. It will be seen from table 6.5 that of all the correlates of RETH, only ATTUD fails to decrease at the 12th grade, and that Educational Plans and Desires, Study Habits, and Achievement decrease at both the 9th and the 12th grade. At the same time, the magnitude of the multiple correlation of all seven of these variables with RETH increases slightly with each higher grade level. What this means is that the group differences are becoming more consistent (or more predictable) at the higher grade levels for all seven variables combined and for ATTUD, and less predictable for the remaining six variables.

Our analyses up to this point have dealt with the consistency of the differences among our six racial-ethnic groups across grade levels. We also noted, in chapter 2, that there were systematic differences between 9th-grade males and females in Attitude Toward Life. The same results hold also for the other grade levels; viz, males tend to have larger standard deviations than females,[1] and whites have consistently smaller standard deviations than any other racial-ethnic group.

In tables 6.3 and 6.4 we studied the relative mean differences among the racial-ethnic groups across grade levels. In figure 6.1 these same differences are presented graphically in terms of sigma units. In other words, for each grade level the distribution of scores on Attitude Toward Life (ATTUD) for all students is set equal to a mean of 50 with a standard deviation of 10, and each group's mean is then expressed graphically on this scale. The most obvious feature of figure 6.1 is that the scores for some of the groups remain relatively constant across grade levels, while others show increases or decreases. However, we cannot conclude that these latter groups are developing either a less or a more optimistic outlook, for, as was seen from table 6.2 on page 58, there are proportionately fewer dropouts among Orientals and whites. By averaging the means for each racial-ethnic group we can obtain a score that is less affected by differences in the dropout rate. These averages are: Indians, 46.4; Mexicans, 45.8; Puerto Ricans, 42.6; Negroes, 45.7; Orientals, 48.1; and whites, 51.3. Hence, on the average, Indians, Mexicans, and Negroes each trail whites by about half a standard deviation, Orientals by about one-third of a standard deviation, and Puerto Ricans by almost a full standard deviation.

As noted earlier, it is difficult to interpret the changes that take place over the grade levels. Most likely some of them do reflect changes in the outlook of these groups above and beyond alterations in their composition due to dropouts. However, since we cannot separate the one effect from the other, we shall make no attempts at interpretation.

More easily approached, at least with present data, is the question of male-female differences. These differences, as indicated by the male mean subtracted from the female mean, are shown for each group and grade level in table 6.6. It will be seen that, for all three grade levels, females have a consistently higher mean than do males, save for one group: 12th-grade Indians. In order to emphasize the consistency of these differences across grade levels we have averaged them without regard to sign. These differences are given in the "average" column of table 6.6, which shows that the largest values are for Negroes and Puerto Ricans and the smallest for whites.[2] But although females consistently

Table 6.5.—Correlation of Racial-Ethnic Group Membership (RETH) With Family Background, Attitude Toward Life, and Achievement, by Grade Level[1]

Set of Variables	Grade Level		
	6	9	12
Socio-Economic Status (SES)	37	38	34
Family Structure and Stability (FSS)	30	30	26
Expectations for Excellence (EXPTN)	17	12	—02
Attitude Toward Life (ATTUD)	22	27	27
Educational Plans and Desires (EDPLN)	22	13	05
Study Habits (HBTS)	22	18	10
Achievement (ACHV)	49	46	45
Multiple Correlation [2]	53	55	57

[1] These analyses are based upon 123,305 6th-grade, 128,108 9th-grade, and 94,096 12th-grade students.

[2] Multiple correlation of all 7 row variables with RETH. Family Background consists of all the row variables except ATTUD and ACHV.

[1] Except for 12th-grade Indians, for whom the reverse is true.

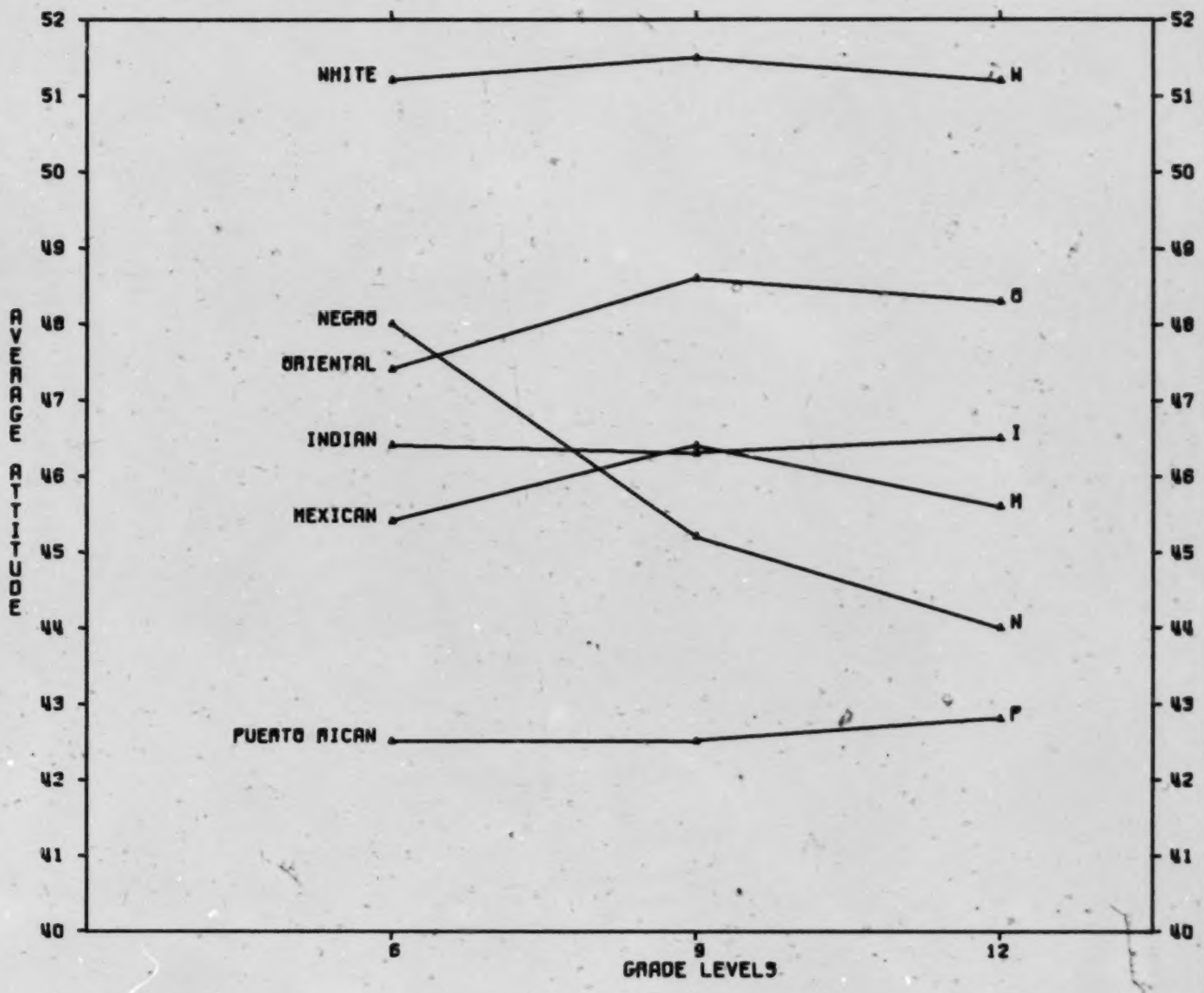
Table 6.6.—Sex Differences in Average Attitude Toward Life, by Grade Level and Racial-Ethnic Group

Racial-Ethnic Group	Mean Differences[1]			
	6	9	12	Average
Indian	1.11	.89	—1.92	1.30
Mexican	1.22	1.92	.95	1.36
Puerto Rican	1.84	1.74	2.64	2.07
Negro	1.38	2.96	2.93	2.42
Oriental	1.39	2.22	1.99	1.86
White	.12	1.29	1.36	.92
Total	.59	1.60	1.45	1.21

[1] Female mean minus male mean.

[2] Actually, if we had averaged the differences taking the sign of the difference into account, Indians would have had the smallest value because of the negative difference at grade 12 (their actual value would have been 0.03).

FIGURE 6.1. - GRADE-LEVEL TRENDS IN AVERAGE ATTITUDE TOWARD LIFE



score higher than males regardless of grade level, the differences are seldom large. In fact, the differences connected with sex are of a lower order than the differences connected with racial-ethnic group membership. This can be shown by forming the pairwise difference between the group means (e.g., by subtracting average ATTUD for Indians from average ATTUD for whites), averaging these differences without regard to sign, and then comparing these values with the average of the above sex differences (i.e., the "average" column in table 6.6). The average sex difference, obtained by adding the first 6 values in the "average" column of table 6.4 and dividing by 6, is 1.65.[3] The average difference among the racial-ethnic groups is 3.42.[4] Thus, the average difference among racial-ethnic groups is roughly twice the average sex difference within groups.

In the next section we shall observe grade-level trends in the kinds of family background factors that are associated with differences among students in their Attitude Toward Life.

6.2. GRADE-LEVEL TRENDS IN THE ROLES OF FAMILY BACKGROUND FACTORS AND ACHIEVEMENT IN ATTITUDE TOWARD LIFE

How similar are the correlations of each of the family background measures and Achievement with Attitude Toward Life across grade levels? Correlates of Attitude Toward Life (ATTUD) are shown in table 6.7 for each separate group, and for all students both before ("total") and after ("total (A)") adjustments have been made in ATTUD.[5] It will be seen from table

[3] If we had averaged the sex differences across grade levels with regard to sign, so that the difference for 12th-grade Indians was added in negatively, this average of the 6 averages would have been 1.44.

[4] Computed by averaging, without regard to sign, the pairwise differences among the 6 group means (viz, a total of 15 mean differences). The means used were the grade-level averages computed in conjunction with figure 6.1.

[5] I.e., Attitude Toward Life was adjusted for its relationship with Racial-Ethnic Group Membership by means of partial correlation techniques.

Table 6.7.—Correlation of Attitude Toward Life (ATTUD) With Family Background and Achievement, by Racial-Ethnic Group Membership and Grade Level

Set of Variables	Indians			Mexicans			Puerto Ricans			Negroes			Orientals			Whites			Total			Total (A)		
	6	9	12	6	9	12	6	9	12	6	9	12	6	9	12	6	9	12	6	9	12	6	9	12
Socio-Economic Status (SES)	27	24	12	32	27	17	33	27	15	23	21	13	41	27	21	29	27	19	33	33	24	32	25	17
Family Structure and Stability (FSS)	40	21	16	55	20	22	56	18	22	35	18	11	63	34	27	25	18	13	38	25	19	43	18	13
Expectations for Excellence (EXPTN)	51	40	23	64	38	17	67	41	22	56	47	30	62	47	24	33	40	29	46	43	26	50	41	27
Educational Plans and Desires (EDPLN)	44	38	31	54	37	32	52	43	40	51	45	35	60	48	39	43	40	31	49	42	31	50	40	31
Study Habits (HBTS)	63	45	33	76	43	43	78	45	40	67	43	32	72	45	30	48	40	32	60	44	34	64	41	33
Achievement (ACHV)	32	37	29	39	41	37	35	39	37	31	38	33	51	40	41	34	41	37	38	46	42	32	39	35
Multiple Correlation (MC)	69	54	42	80	55	54	83	56	54	73	58	47	80	57	48	58	53	45	68	58	50	51	54	45

NOTE.—MC=multiple correlation of all 6 row variables with ATTUD. Family Background consists of all row variables except ACHV.

6.7 that each of the family background variables, in almost every group, has a progressively decreasing relationship with ATTUD at the higher grade levels. Slight exceptions occur for Family Structure and Stability (FSS) among Mexican-Americans and Puerto Ricans as the analysis moves from the 9th to the 12th grade, and for Expectations for Excellence (EXPTN) among whites as it moves from the 6th to the 9th grade. For Achievement (ACHV) a truncation or maximum value occurs at the ninth grade, while the adjacent grades have somewhat lower values. The only exception to this trend is that of Oriental-Americans, for whom the relationship of ACHV with ATTUD is lowest at the ninth grade. The multiple correlations of ATTUD with the six variables also show a progressive decline by grade, from lower to higher. A slight exception to this occurs for the "total (A)" analyses: after adjustments are made in ATTUD for RETH, the maximum multiple correlation occurs at the ninth grade (it should be emphasized that we are referring here only to the multiple correlations). In general, we may conclude that the overall trend is for the magnitude of these relationships to decrease at the higher grade levels. We must caution, however, that this is due to an unknown degree to the interrelationships of at least three factors:

1. Real changes in the nature of these relationships across grade levels.
2. The changing composition of the student samples due to dropouts.
3. The changing composition of the indices at the 6th as compared with the 9th and 12th grades.

Because all these changes are occurring, we shall emphasize regularities in the order of magnitude of the relationship of different sets of variables with ATTUD in the analyses that follow.

Another thing we need to know about these relationships is how the percentage of variation in Attitude Toward Life (ATTUD) accounted for by different combinations of these variables differs by grade level. Figure 6.2 presents these percentages. The first set of variables whose grade-level trend we would like to observe is Home Background (HB), which consists of Socio-Economic Status (SES) and Family Structure and Stability (FSS), and is represented by the double-crosshatched areas in figure 6.2. It will be seen that for each separate racial-ethnic group, as well as for the three sets of "total" analyses, the percentage of variation in ATTUD accounted for by these variables decreases at the higher grade levels. This trend also holds for females and for males, except Indian males, for whom a temporary drop occurs at the ninth grade.[6]

The next step was to bring Achievement into the analysis with Home Background, a step represented by the combined double-crosshatched areas in figure 6.2 combined with the areas lined from lower left to upper right. Here, the same trend is in evidence, but with more exceptions. For example, whites (except for males) show a slight increase at the 9th grade and a decrease at the 12th. Similarly, the value for Indian males and for Oriental females drops at the 9th grade to increase again at the 12th, while that for Negro females and "total (U)" females increases slightly at the 9th grade to drop again at the 12th. When Family Process (PRCS) is brought into the analysis with Home Background (HB) and Achievement (ACHV), the trend is again toward decreasing values at the higher grades, with minor exceptions for Indian and Mexican males. As we noted before, much of this decline can be attributed to the occurrence at the higher grades of dropouts, who would probably score low on Attitude Toward Life as well as on many of the Family Background variables. Unfortunately, we lack data on the individual students who drop out.

We will postpone discussion of the percentages and the grade-level trends for the 10 school variables (SCH) until the next section. Meanwhile, we should note that even when these variables are brought into the analysis, values continue to decline at the higher grade levels. We therefore need to ask: To what extent do the explanatory roles of different sets of variables change between the ninth grade and other grades? Let us take up this question first with regard to the relative roles in Attitude Toward Life of Socio-Economic Status (SES) and Family Structure (FSS). Unitized commonality analyses for these sets of variables are displayed in figure 6.3.[7] It may be recalled from chapter 2 that the unique role of SES exceeded that of FSS for almost every group except Oriental males, Oriental males and females combined, and male Indians. These results are repeated in figure 6.3, from which it is evident that grade-level trends do exist, and that they are different for some of the groups. For example, for Indians, Mexicans, and Puerto Ricans the unique role of FSS tends to equal or (more usually) exceed that of SES by a substantial amount, for both males and females. For Negroes, the unique role of FSS is exceeded by that of SES, except at the sixth grade. For whites, on the other hand, the

[6] As noted in figure 6.2, the "total (U)" and "total (A)" analyses were not available for males and females at the 6th grade.

[7] The percentages divided out by this unitizing procedure can be retrieved from the double-hatched areas in figure 6.2.

FIGURE 6.2. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS, BY GRADE LEVEL, SEX, AND RACIAL-ETHNIC GROUP MEMBERSHIP

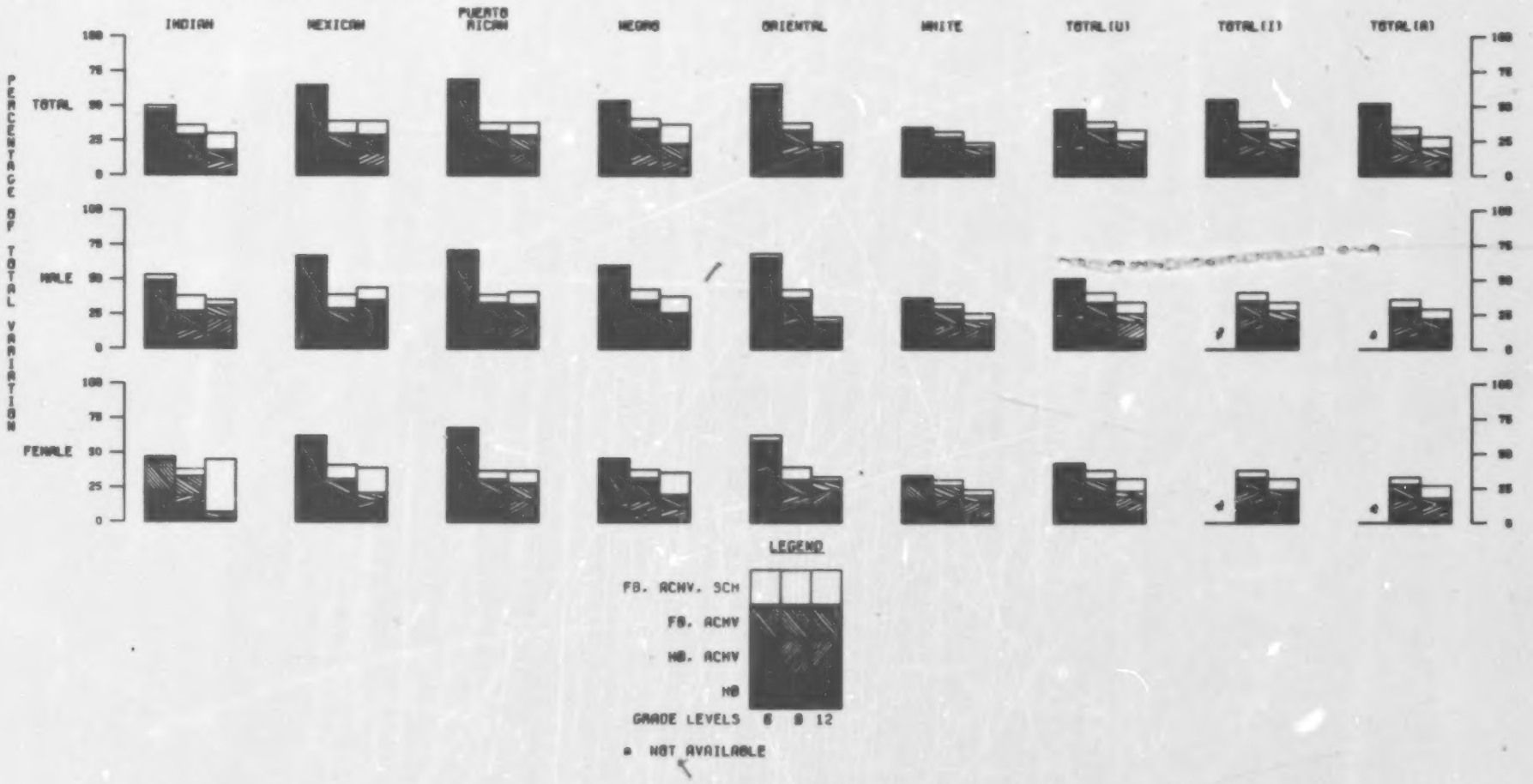
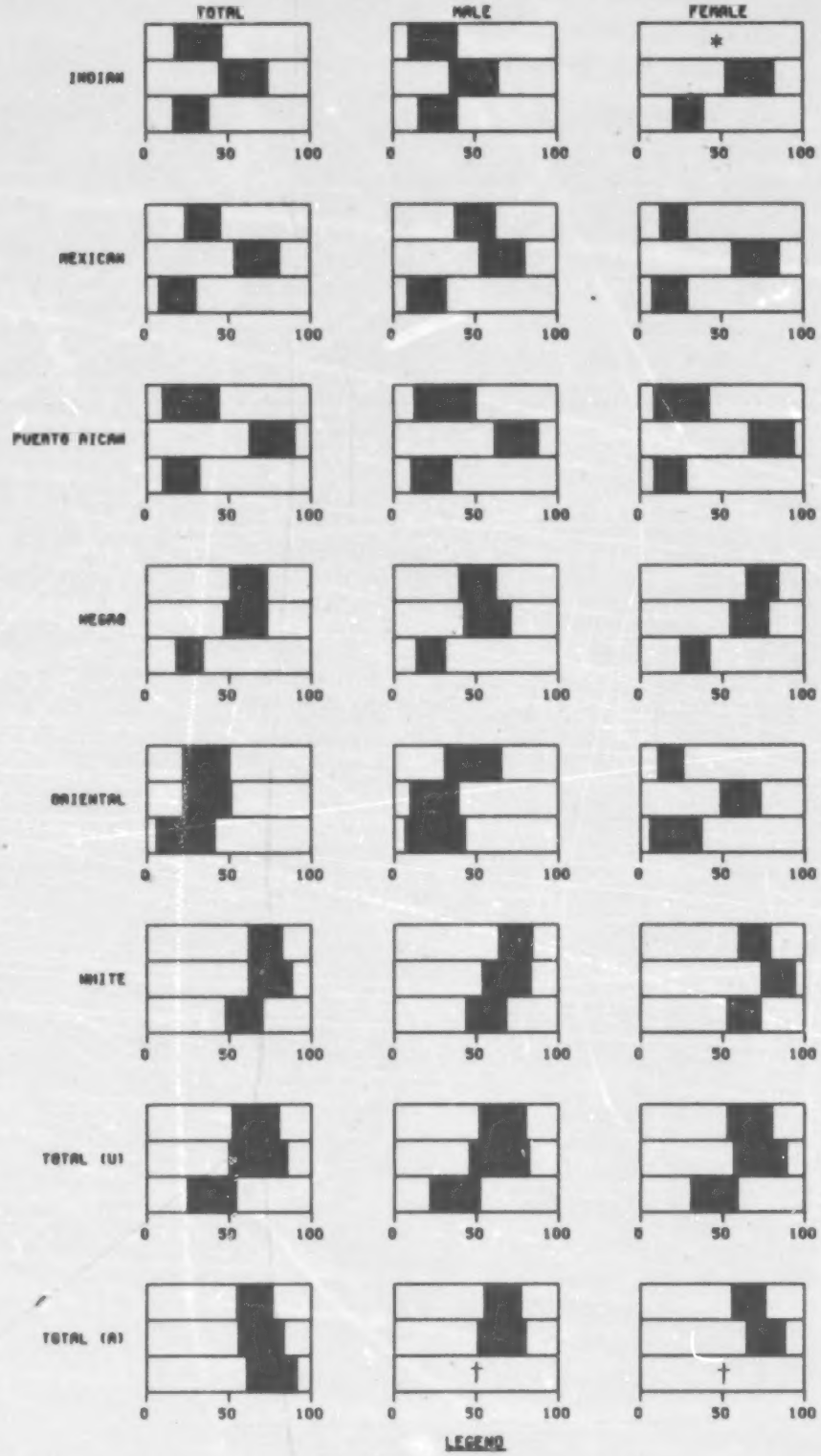


FIGURE 6.9. - THE ROLES OF HOME BACKGROUND FACTORS IN ATTITUDE TOWARD LIFE, BY RACIAL-ETHNIC GROUP, SEX, AND GRADE LEVEL



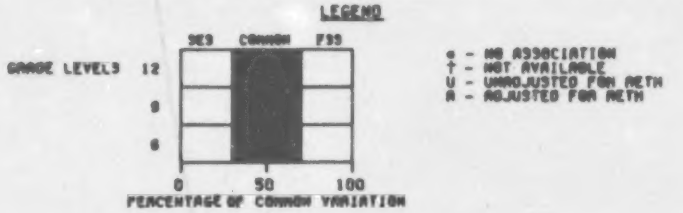
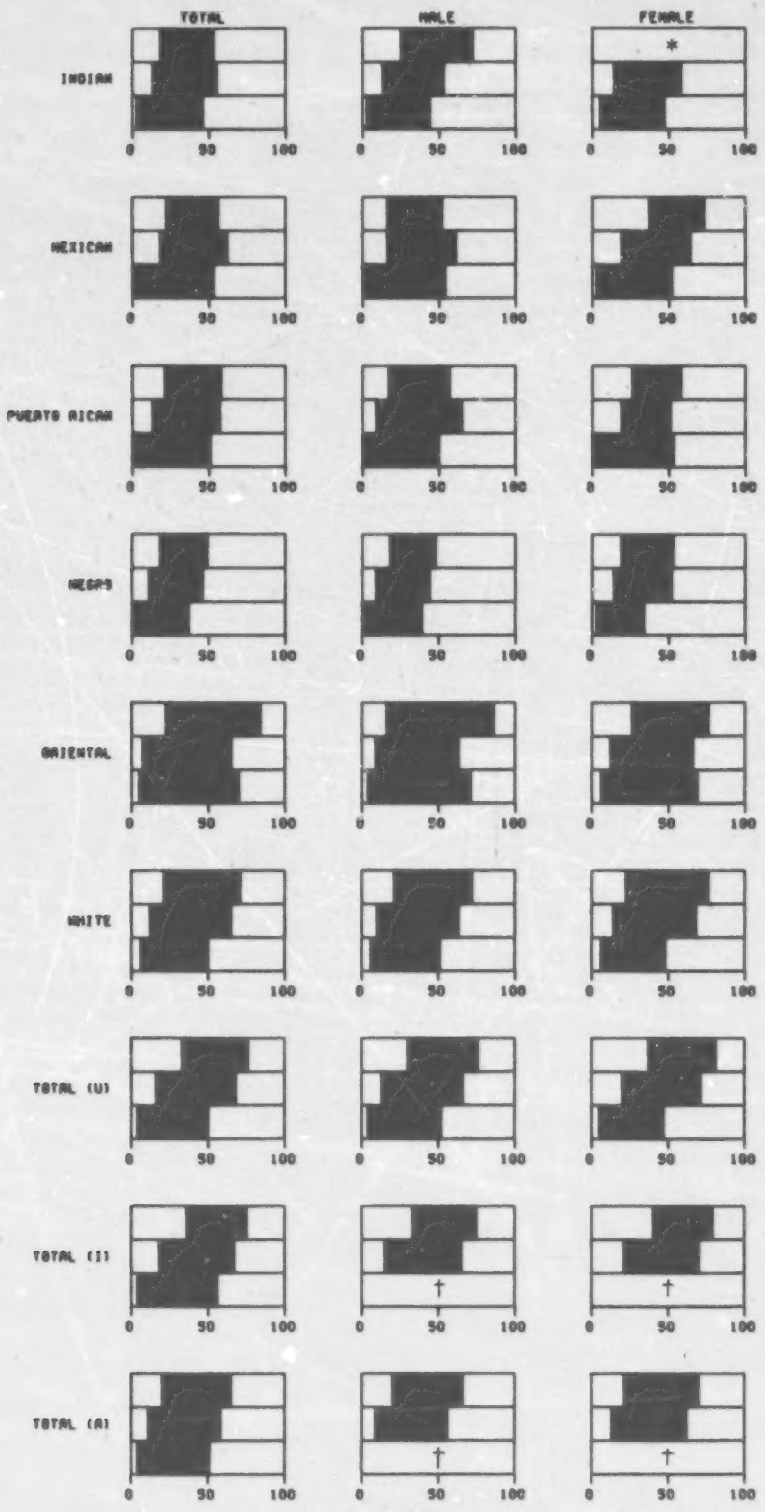


FIGURE 6.4. - THE ROLES OF ACHIEVEMENT AND FAMILY BACKGROUND FACTORS IN ATTITUDE TOWARD LIFE, BY RACIAL-ETHNIC GROUP, SEX, AND GRADE LEVEL



unique role of SES consistently exceeds that of FSS, although SES tends to assume a larger and FSS a smaller role at the higher grade levels. When all students are combined without adjustment ("total (U)"), the unique role of SES increases at the higher grade levels while that of FSS decreases. Also noteworthy is the fact that the unique role of FSS exceeds that of SES at the sixth grade. When ATTUD is first adjusted for RETH ("total (A)"), the unique role of SES consistently exceeds that of FSS at all grade levels. On the basis of these trends, we are inclined to conclude that FSS plays a greater role in ATTUD, independently of SES, than had appeared from the ninth-grade results. This seems particularly so for groups other than whites.

We next examined the relative explanatory role of HB-ACHV when juxtaposed with the set of PRCS variables.[8] These unitized analyses are presented graphically in figure 6.4, from which it can be seen that there are two important trends.[9] The first is for the common portions to be consistently large: they range from one-third to as much as two-thirds of the common variance. In other words, for every group and grade level there is a high degree of interdependence between HB-ACHV and PRCS as they relate to ATTUD. This is hardly surprising; we saw in chapter 2 that for most groups it was HB and ACHV combined rather than one or the other alone that was involved in PRCS as they both related to ACHV. The second trend is that, for almost all groups, the unique role of PRCS is consistently larger than that of HB-ACHV. The main exceptions occur at the 12th grade for Mexican females, Orientals of both sexes, and all students combined (both "U" and "I" analyses). We are, therefore, inclined to conclude that our 9th-grade results also hold good for the other grade levels, with the exception of some groups at the 12th grade.

Our next question, then, is: How similar are the relative explanatory roles of Educational Plans and Desires (EDPLN) and Other Motivational Measures (OTHER) across grade levels, after Attitude Toward Life has first been adjusted for Home Background and Achievement? The unitized commonality analyses for these sets of variables are given in figure 6.5.[10] It will be seen from the bar graphs in figure 6.5 that, almost without exception, the unique role of OTHER exceeds that of EDPLN, often to a very substantial degree. The one exception is for 12th-grade Oriental males, for whom the reverse is true. We are therefore inclined to conclude that our ninth-grade results also hold good for the other grade levels. These results were that the more immediate kinds of student and parent involvement, reflected by OTHER, rather than their longer range educational plans, reflected by EDPLN, make a difference in explaining their outlook on life.

In the next set of analyses we shall attempt to summarize grade-level trends in Attitude Toward Life (ATTUD) that are associated with a student's geographic area of residence. In order to do this we have adopted a somewhat different analytic framework from the one in chapter 3. In that chapter we compared the mean or average ATTUD of students in northern and southern metropolitan and nonmetropolitan areas. The result was a number of comparisons too large to carry over into analyses by grade level. Accordingly, a framework was used in this section that reduces the number of comparisons while at the same time allowing for a finer geographic differentiation. This was possible because the divisions between North and South and between metropolitan and nonmetropolitan were replaced by two variables that encompassed a greater range of diversity. For example, we used a variable that captured differences between North, Far West, *and* South. In order to develop this variable, we scored Southern States lowest, Northern States highest, and Far Western States in between (for the States assigned to each region, see p. 6). These relative values tended to correspond to the actual mean achievement levels of these three groups (Okada et al., 1969). We also used a variable designed to reflect rural-suburban-urban location, as follows:

Scale Value:	Description of Location
1	In a rural area.
2	In a small town (5,000 or less).
3	In a city of 5,000 to 50,000.
4	In a residential suburb.
5	In an industrial suburb.
6	In a residential area of a larger city (50,000+).
7	In the inner part of a larger city (50,000+).

Taken together these two variables are used to represent Area of Residence.[11] They are used in regression and commonality analyses along with the set of five family background measures and Achievement to show the percentage of variation in Attitude Toward Life that is unique and the percentage that is in common with these sets of variables.[12] Since these analyses have not been presented before, we will first discuss R-squares for the different sets of variables and then grade-level trends for the commonality analyses.

The R-squares in figure 6.6 are presented in such a manner that one can see the percentage of variation in Attitude Toward Life accounted for by Area of Residence (A). This percentage is represented in each case by the shaded portion, while the percentage of variation accounted for by both sets of variables, FB-ACHV and A, is given by the shaded and plain portions combined. Since the percentage of variation associated with FB-ACHV has already been discussed, we will concentrate here on the shaded portions. It will be noted that they tend to be very small, and usually decrease at the higher grade levels. The largest value occurs for Oriental-Americans, while the smallest ones occur for whites and for all three sets of "total" analyses.

[8] "HB-ACHV" refers to the two home background variables of Socio-Economic Status and Family Structure and Stability, combined with Achievement, while "PRCS" refers to the three family process variables of Expectations for Excellence, Study Habits, and Educational Plans and Desires.

[9] The percentages of variation divided out can be retrieved from the double-hatched and slanted line areas in figure 6.2.

[10] The percentages of variation divided out can be ascertained from figure 6.5 by subtracting the double-crosshatched areas, with the areas lined from lower left to upper right, from the total lined areas.

[11] The correlations between these two variables are 0.14, 0.18, and 0.24, at the 6th, 9th, and 12th grades, respectively, for all groups combined. The numbers of students are given in table 6.2.

[12] Interpretational differences will arise between the results presented here and those in chapter 3 because in these analyses FB-ACHV is taken into consideration. Some of the differences among the regional groups in chapter 3 can be more readily attributed to differences in FB-ACHV, while still others are in common with FB-ACHV and Area of Residence. This is not a shortcoming of the analyses in chapter 3, for they were prepared primarily to indicate the magnitude of regional differences and not to explain why these differences arise. The analyses presented here are directed more to this latter point.

FIGURE 6.5. - THE ROLES OF EDUCATIONAL PLANS AND OTHER MOTIVATIONAL MEASURES IN ATTITUDE TOWARD LIFE, BY RACIAL-ETHNIC GROUP, SEX, AND GRADE LEVEL AFTER ADJUSTING FOR HOME BACKGROUND AND ACHIEVEMENT

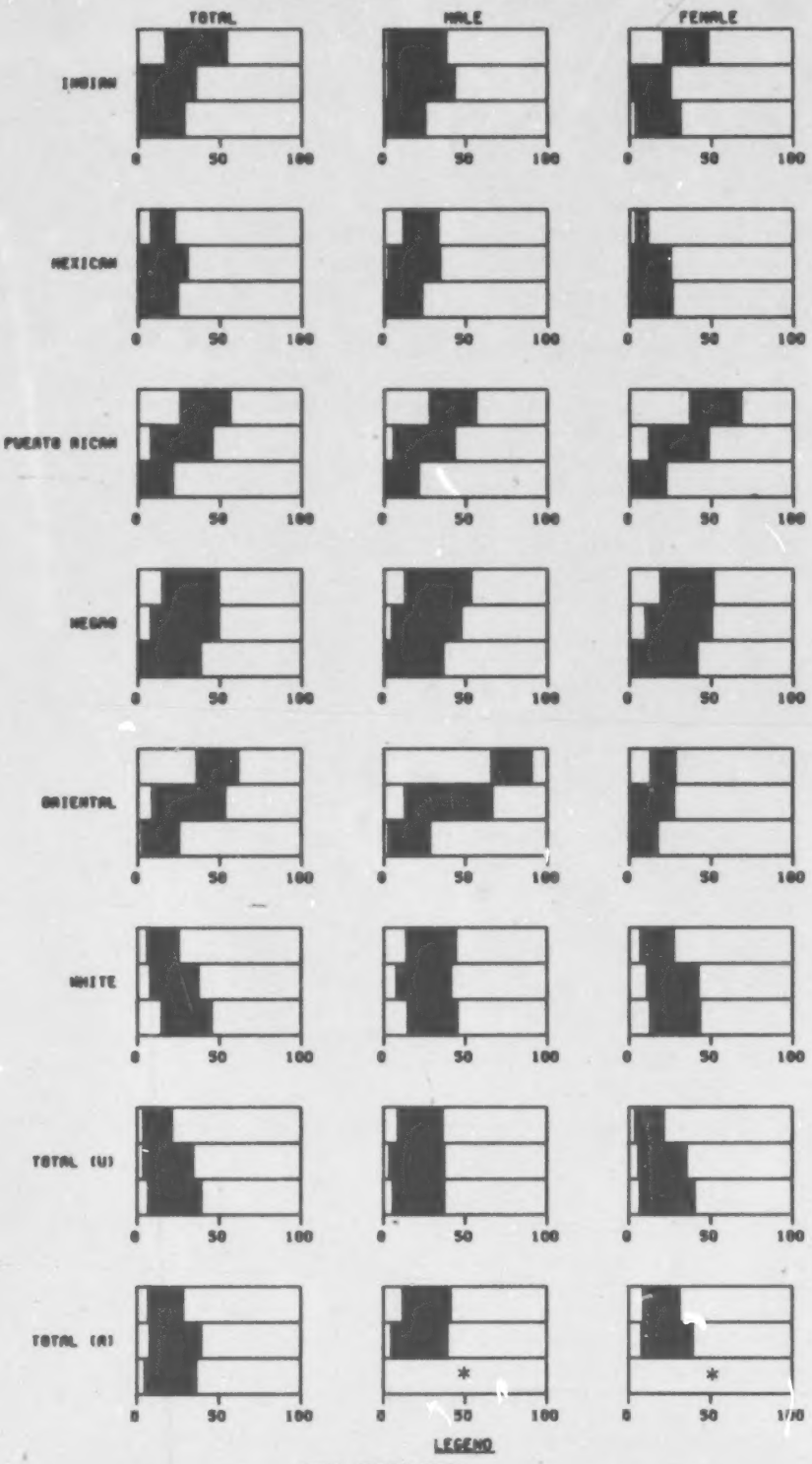
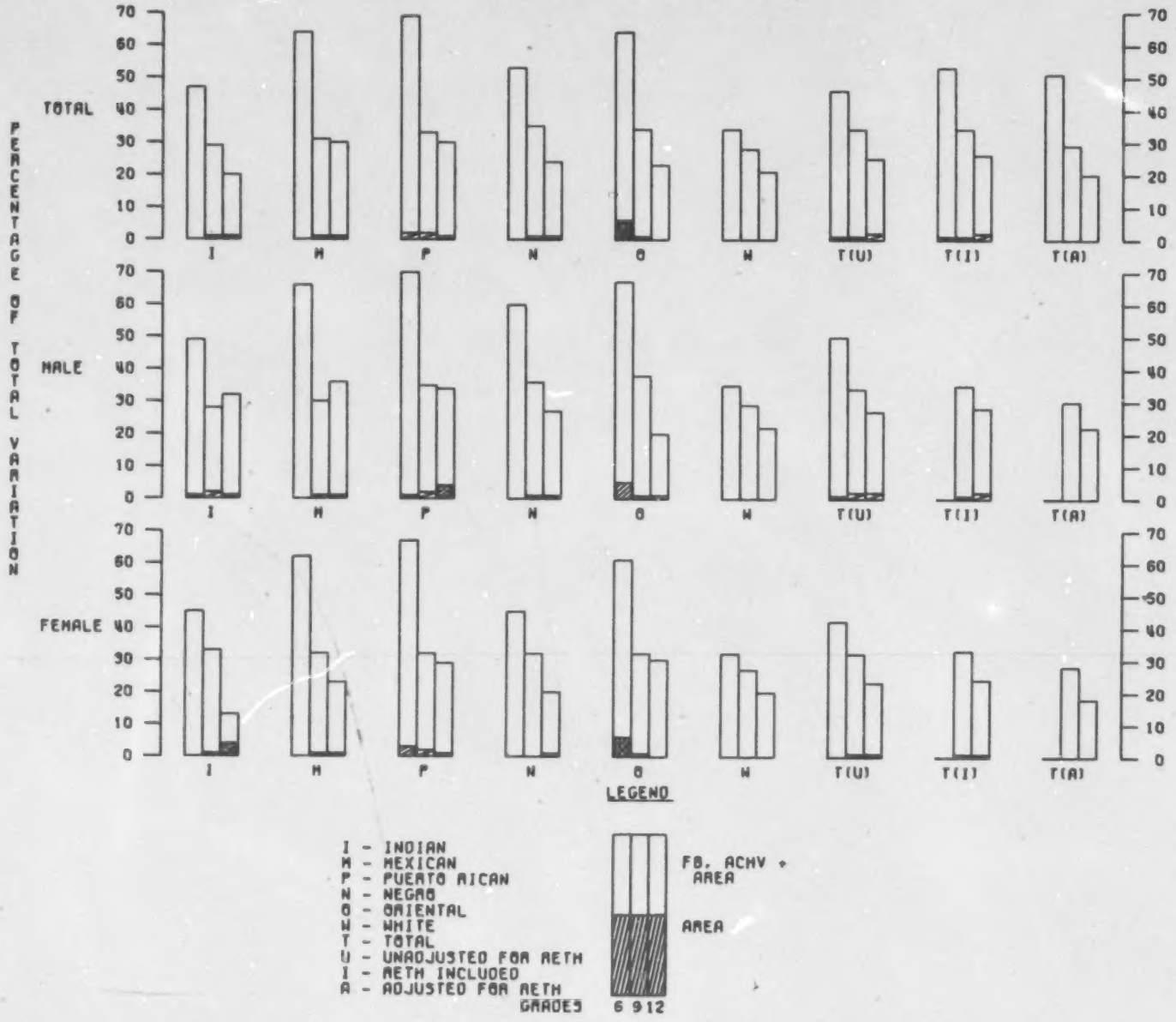


FIGURE 6.6. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ACCOUNTED FOR BY AREA OF RESIDENCE, FAMILY BACKGROUND, AND ACHIEVEMENT, BY SEX AND RACIAL-ETHNIC GROUP MEMBERSHIP



Slight sex differences in these percentages also occur for groups other than whites.

Although these percentages are low, the extent to which they are confounded with FB-ACHV in their relationship with ATTUD can be shown only by commonality analyses. However, when we performed such analyses we found that both the unique and the common portions of A were always so small and the unique role of FB-ACHV always so much larger that we did not consider the results worth presenting here.

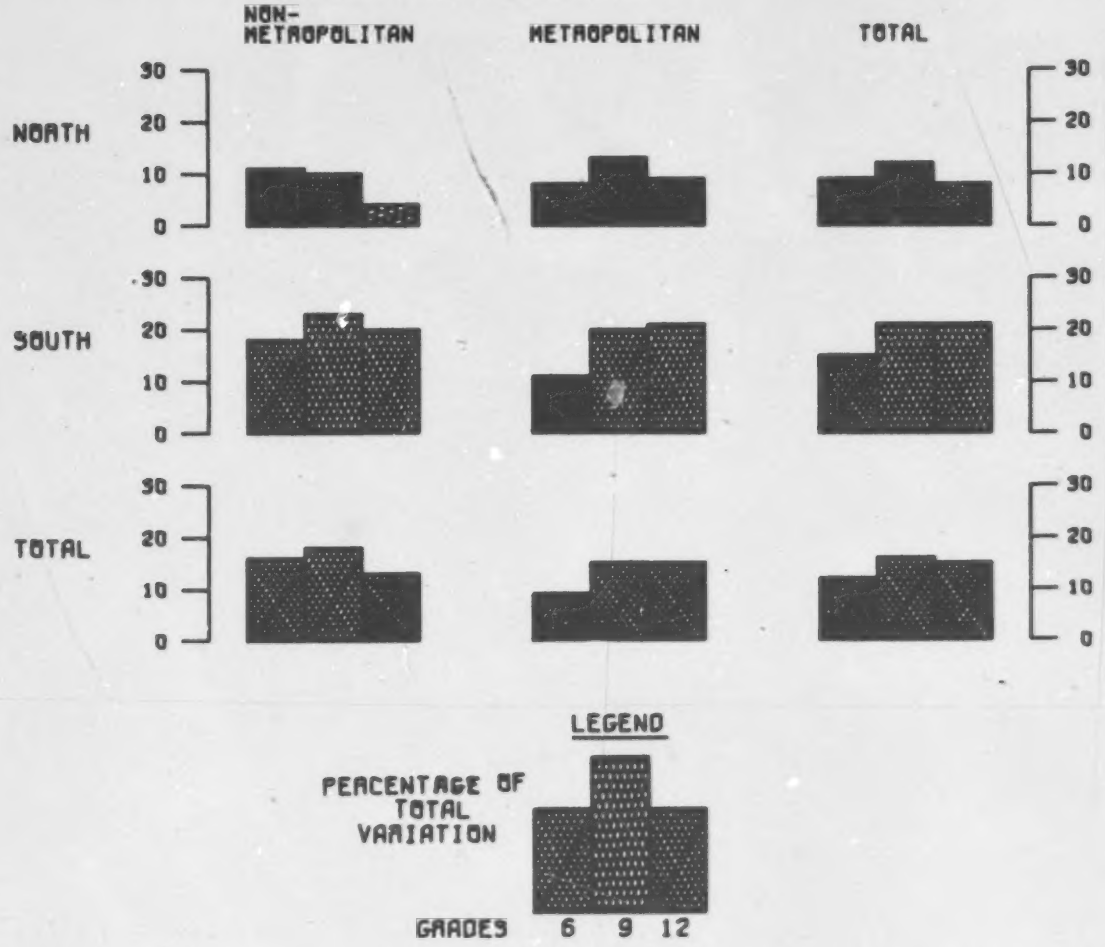
6.3. GRADE-LEVEL TRENDS OF THE ROLES OF FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS IN ATTITUDE TOWARD LIFE

In this section we shall examine grade-level trends when school factors are brought into the analysis. However, we shall dwell on these trends only in the case of all students combined. This is because our primary interest is in the possible effects of school variables on Attitude Toward Life, and we already know that some of the most pronounced differences among schools are associated with the racial-ethnic composition of the student body. Consequently, we have chosen to emphasize the "total" analyses.

Our first question is: To what degree is the association of student's Attitude Toward Life (ATTUD) with school factors similar across grade levels and regions? The computation of this percentage, described in detail in chapter 4, is obtained by regressing the set of 10 school factors on individual ATTUD.[13]

[13] The 10 school variables are described in detail in chapter 1. RETH is not included in these analyses, since it did not contribute anything to ATTUD above and beyond what was already included in FB and ACHV (see figure 6.2 and chapter 5).

FIGURE 6.7. - PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ASSOCIATED WITH SCHOOL FACTORS, BY GEOGRAPHIC LOCALE AND GRADE LEVEL



The resulting squared multiple correlations, called $R^2(SCH)$, are presented graphically in figure 6.7. It will be seen that they are uniformly higher in the South than in the North, and that, except for the nonmetropolitan North, they tend to be higher at the ninth than at any other grade. Since there are these variations by grade level, we are led to ask: Are the combinations of factors that explain the variation similar for each grade level within each region? The technique used here to inspect these differences is the same as in chapters 2 and 5; that is, an analysis is made of the extent to which the variation in ATTUD associated with school factors is confounded with FB and ACHV, or can be uniquely associated with the set of school factors. In order to ascertain this we employ the following partitioning:

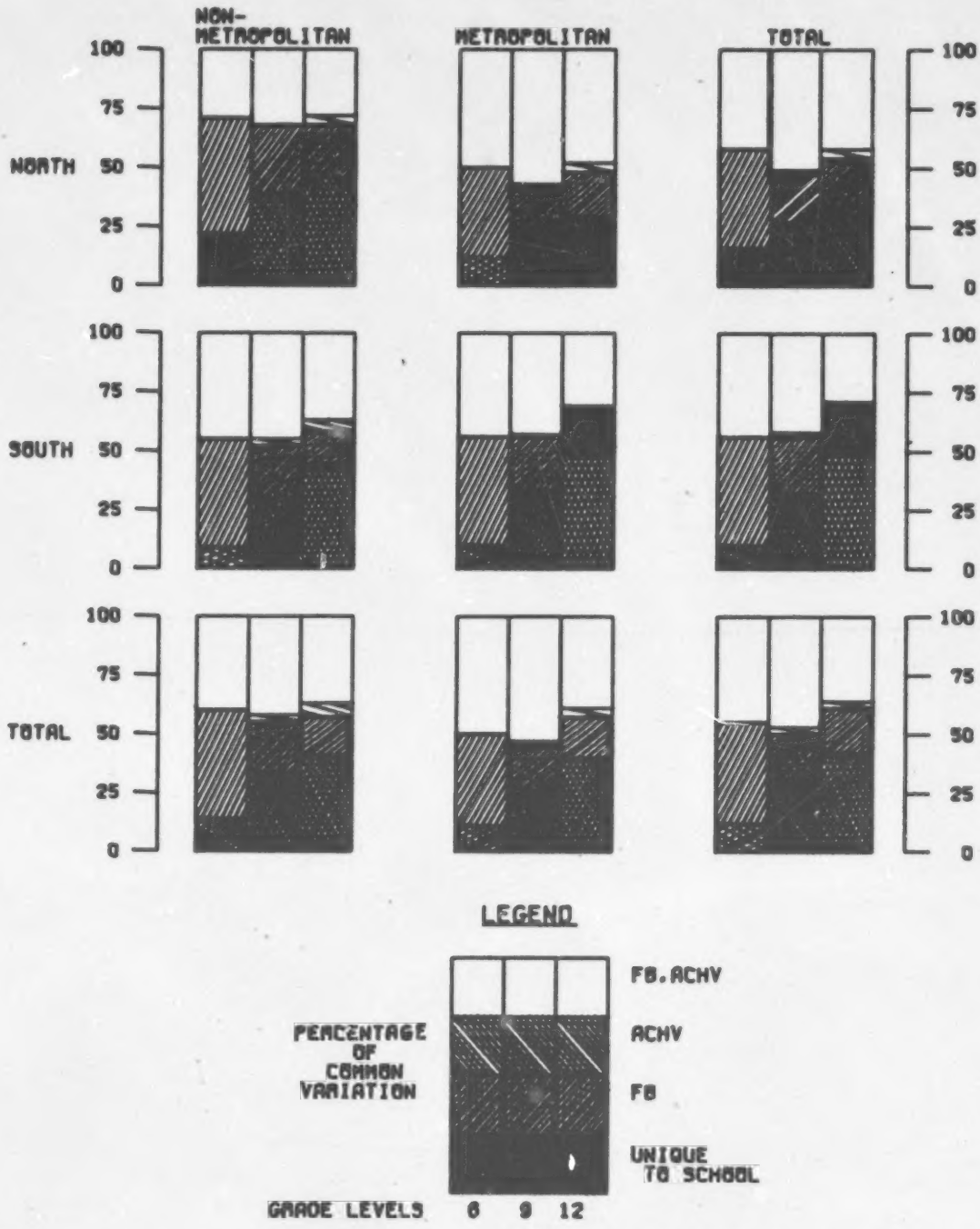
$$R^2(SCH) = C(FB,ACHV,SCH) + C(ACHV,SCH) + (FB,SCH) + U(SCH)$$

By dividing the equation through by $R^2(SCH)$ we obtain coefficients that sum to 100 and hence are comparable across regions and grade levels. These are the coefficients shown in figure 6.7.

These unique and common roles are given in figure 6.8. The shaded portions of the bar graphs show that the proportion of variance in SCH associated with ATTUD independently of FB and ACHV increases progressively over the grade levels for each region. At the same time, the percentage of variation in ATTUD that is confounded with FB and SCH factors shows a progressive decline.[14] The percentage of variance in ATTUD that is confounded with ACHV tends to be negligible. There are some marked regional differences among these percentages. The same is true of the grade-level trend for the variance that is confounded with FB and ACHV (represented in figure 6.8 by the plain portions). In the North these values increase at the 9th grade to decline again at the 12th, whereas in the South they decline gradually from the 6th grade on. On the basis of these results we are inclined to conclude, as we did in chapter 5, that the shared percentages were greatest for "FB, SCH," and "FB, ACHV, SCH," and low-to-negligible for the "ACH, SCH" combination. Here, of course, our conclusions apply to all three grades, not just the ninth. However, we now conclude that from as little as 10 to as much as 50 percent of the variation in ATTUD associated with school factors occurs independently of FB and ACHV. This is a slight departure from the findings al-

[14] Family Background (FB) consists of Home Background (HB) plus Family Process (PRCS), all of which are described in chapter 1.

FIGURE 6.8. - THE UNIQUE AND COMMON ROLES OF SCHOOL FACTORS IN ATTITUDE TOWARD LIFE, BY GEOGRAPHIC LOCALE AND GRADE LEVEL

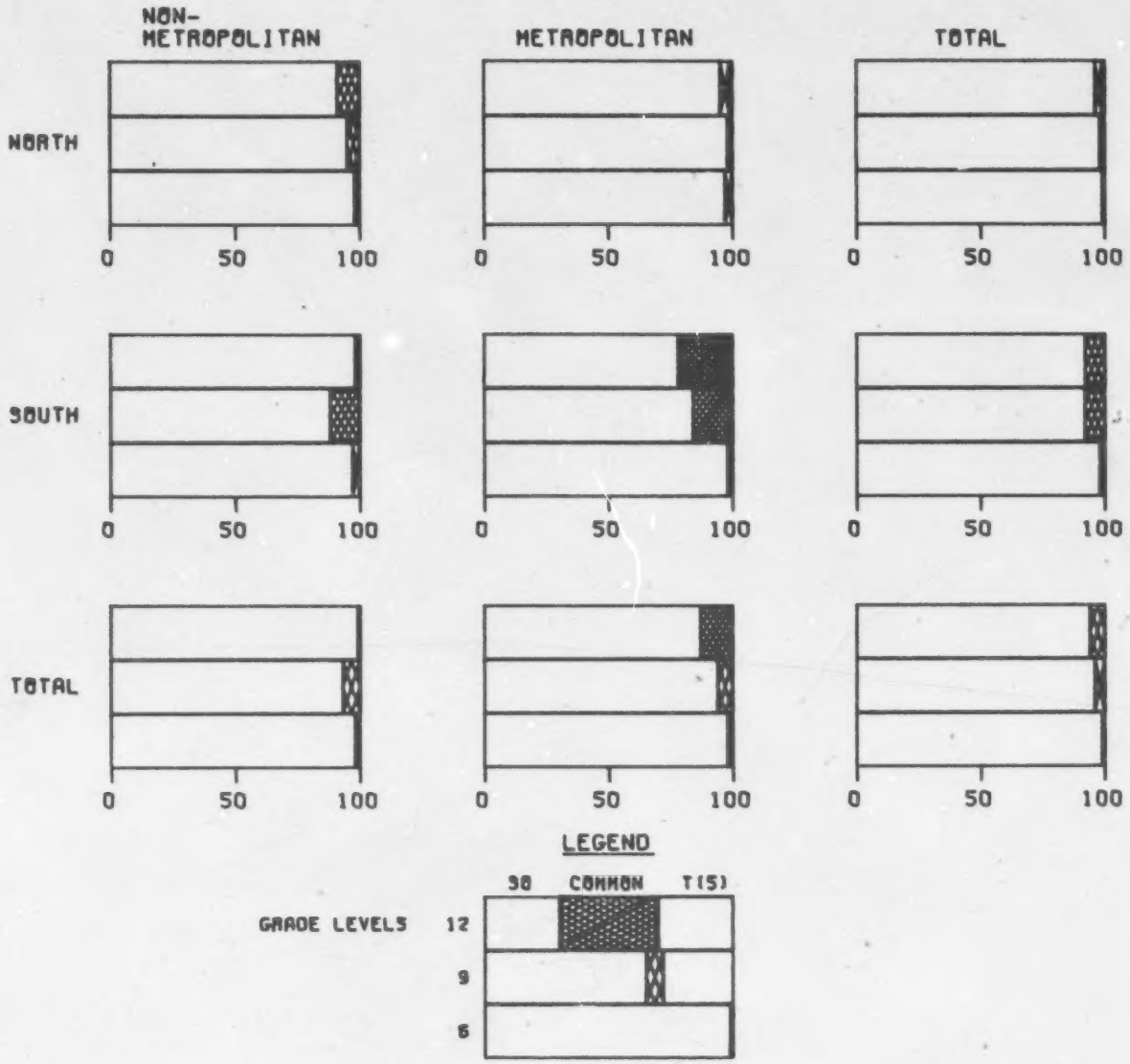


ready expressed in figure 5.2 on page 45, where the variation ranged from about 20 to about 50 percent.

We have reviewed the percentage of variance in Attitude Toward Life that is associated with school factors either uniquely or in combination with Family Background and Achievement. It is now time to ask: How does the relative explanatory role of different subsets of the set of 10 school factors (SCH) compare across grade levels? We shall begin by examining the relative role of the set of five student body variables and that of the set of five teacher variables.[15] First, however, we shall adjust Attitude Toward Life (ATTUD) for its relationship with Family Background (FB) and Achievement (ACHV) by means of partial correlation techniques, and then perform commonality analyses on the variation in Attitude Toward Life that remains.

[15] These sets are described in chapters 1 and 5.

FIGURE 6.9. - THE ROLES OF SCHOOL OUTCOMES AND TEACHER ATTRIBUTES IN ATTITUDE TOWARD LIFE, BY GEOGRAPHIC LOCALE AND GRADE LEVEL

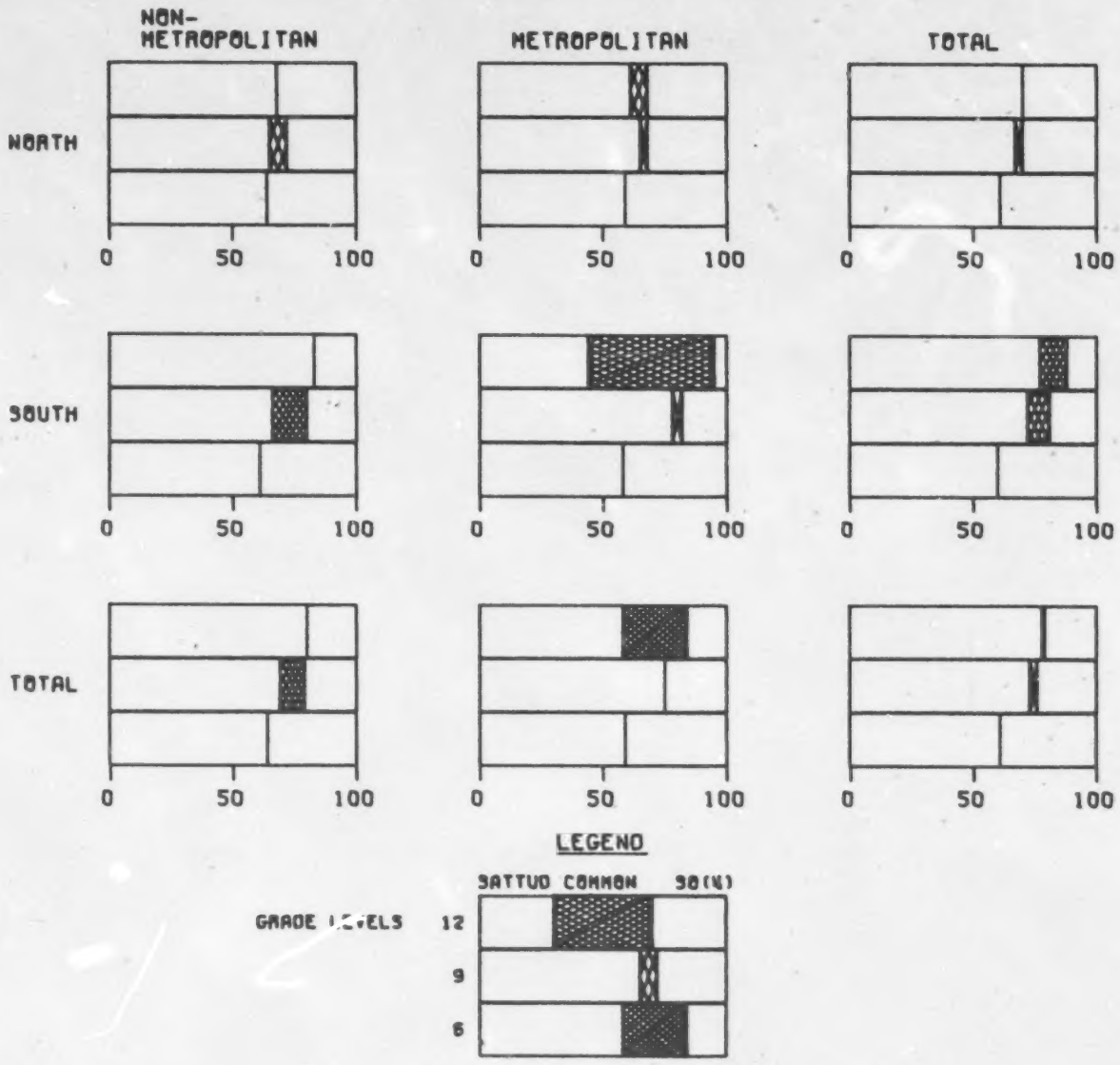


This variation corresponds to from 10 to 50 percent of the variation in ATTUD that is independent of FB and ACHV (the exact value depends in each case on region and grade level).[16] The results of unitized commonalities for these two sets of variables are given in figure 6.9. It will be seen that the results for grades 6 and 12 are remarkably similar to those already obtained for grade 9. These results are that the unique role of the set of five teacher attributes (T(5)) ranges from negligible to zero, while that of the set of five student body variables (SO(5)) is overwhelmingly large. This does not mean that teacher attributes have no influence on Attitude Toward Life. It does mean, however, that the influence of these attributes is at best small, as well as completely confounded with the set of student body variables. Hence, the student body's level of achievement and motivation, as represented by SO(5), plays a very large role, among all the possible school factors, in explaining differences among students in their Attitude Toward Life.

Our final question then is: How similar in magnitude are the explanatory roles played by subsets of the set of five student body variables when compared by grade? The subsets used will be those of Student Body's Attitude Toward Life (SATTUD), juxtaposed with the other set of four student body variables (SO(4)); viz, their average Expectations for Excellence, Educational Plans and Desires, Study Habits, and Achievement. The results of unitized commonality analyses with these two sets of variables are given in figure 6.10. It will be noticed that, for all

[16] The magnitude of these values can be ascertained by multiplying the percentage corresponding to the double-hatched area from figure 6.8 by its respective percentage value from figure 6.7. For example, for the 6th grade, North, the 22 percent that is independent of FB and ACHV in figure 6.8 times the 11 percent from figure 6.7 gives about 2 percent. That is, 2 percent of the total variation in ATTUD is associated with SCH independently of FB and ACHV.

FIGURE 6.10. - THE ROLES OF DIFFERENT SCHOOL OUTCOMES IN ATTITUDE TOWARD LIFE, BY GEOGRAPHIC LOCALE AND GRADE LEVEL



regions and grade levels, SATTUD has a very much larger unique role than SO(4). However, SO(4) usually has a substantial unique role as well. The common portions, with only a few exceptions, range from negligible to zero. We are inclined to conclude, as we did for the ninth grade, that Student Body's Attitude Toward Life is the chief variable to be considered in explaining the possible effects of school factors on Attitude Toward Life. But because of its substantial unique role, SO(4) can be thought of as a secondary set. The regional results for grades 6 and 12, in contrast to those for grade 9, show no marked trend for the unique role of Student Body's Attitude Toward Life.

6.4. SUMMARY

In this chapter results from the 6th and 12th grades were compared with those already obtained at the 9th grade. We first examined the stability of racial-ethnic and sex differences over these grade levels. Our analyses showed that, with only a few exceptions, groups that ranked high or low on either series of variables at one grade level tended to rank in the same order on those variables at the other grade levels. For example, whites and Orientals tended to rank highest and Puerto Ricans lowest. The greatest shifts between grade levels occurred for Mexicans, Negroes, and Indians. Many of these shifts could be attributed to dropouts, of whom there were more at the higher grades.

Whatever the reason, a greater variety of group differences was observed at the 12th than at the other grade levels (i.e., the intercorrelations of the ranks tended to be lower). However, at each grade level the rank correlations of Attitude Toward Life with Achievement were high enough to allow us to use Racial-Ethnic Group Membership to explain differences among stu-

dents in their Attitude Toward Life.[17] For each racial-ethnic group an average of their scores on Attitude Toward Life (ATTUD) was computed. These averages showed that Oriental-Americans were about one-third of a standard deviation below whites, while Indian Americans, Negroes, and Mexican-Americans were each about one-half a standard deviation below them. Puerto Ricans were lowest of all, with an average score nearly a whole standard deviation below the whites. Females of each group tended to have higher scores than their male counterparts, though not by much: average differences among the racial-ethnic groups in ATTUD were about twice as great as the average sex difference within these groups. Systematic and consistent differences in the standard deviations of ATTUD for all grade levels were also noted. For instance, males were more variable than females, and whites were less variable than members of the other groups.

We then performed similar analyses for the association of Family Background (FB) and Achievement (ACHV) with Attitude Toward Life (ATTUD). We found a pronounced tendency for the magnitude of these values to decrease at the higher grades. The few exceptions that did occur usually involved groups other than whites. In view of this trend we wondered if the relative explanatory role of different sets of variables, when placed in combination, remained similar to that observed at the ninth grade. The roles played by Socio-Economic Status (SES) and Family Structure and Stability (FSS) were examined first. Results from the other grade levels showed that FSS played a greater role in ATTUD, independently of SES, than we would have expected from observing only ninth-grade results. This seemed particularly so for groups other than whites.[18]

Our next concern was with the stability of the relative role of Home Background (HB) and Achievement (ACHV) when placed in context with Expectations for Excellence (EXPTN), Study Habits (HBTS), and Educational Plans and Desires (EDPLN), the three variables that make up Family Process (PRCS). The results were sufficiently similar over the grade levels for us to arrive at much the same conclusions as we had for the ninth grade; viz:

1. The common portions were consistently large, ranging from a low of one-third to a high of as much as two-thirds of the common variation.
2. For almost all of the groups, the unique role of PRCS was consistently larger than that of HB-ACHV.

We may interpret (*1*) as indicating that there is a great deal of interplay between HB-ACHV and PRCS as they relate to ATTUD. We saw in chapter 2 that most of this interplay involved the inseparable effects of HB and ACHV. As for (*2*), it clearly indicates that the nature of the parent-child involvement plays an important role in the development of ATTUD.

Our next analyses focused on those aspects of Family Process (PRCS) that played the greatest relative explanatory role in Attitude Toward Life. We first adjusted differences among students in Attitude Toward Life for their relationship with Home Background and Achievement. Analyses were then run of Educational Plans and Desires and the other Family Process measures, called Other. Analyses with these two sets of variables showed that the unique role of Other almost always exceeded that of EDPLN, often to a substantial degree. In view of these results, we are inclined to conclude that it is the more immediate kinds of student and parent involvement rather than their longer ranger educational plans that make a difference to the student's outlook on life.

We also investigated the extent to which differences among students in their Attitude Toward Life (ATTUD) were associated with their "area of residence," both before and after Family Background (FB) and Achievement (ACHV) had been taken into account. In order to denote area of residence we used two variables, one pertaining to region and the other to rural-suburban-urban location. We found that the variation in Attitude Toward Life associated with Area of Residence (A) tended to be small, ranging from 6 percent for Orientals to zero for whites—and these values tended to decline at the higher grade levels. After FB and ACHV had been accounted for, these values became even smaller. We are therefore inclined to conclude that almost all the small association of A with ATTUD is confounded with FB and ACHV. Although sex differences were observed for some of these groups and grade levels, they were seldom consistent enough to constitute a stable phenomenon.

Finally, we asked: How similar are the associations of school variables, taken as a single set (SCH) and in combination with FB and ACHV, across grade levels? For this question we concentrated on analyses that involved all students combined. We did so because our earlier work had shown that schools with student bodies of predominantly different racial-ethnic composition differed importantly in other respects. We used the same set of 10 school variables (SCH), 5 pertaining to the student body and 5 to the teachers, that we had used in earlier chapters. We found that the percentages of variation in ATTUD associated with SCH tended to be uniformly higher in the South than in the North, and higher at grade nine than at the other grade levels.

Since these grade-level changes did occur, we wondered if the relative explanatory roles of different sets also changed. We first examined the extent to which the variation in ATTUD associated with SCH factors was confounded with FB and ACHV in their various possible combinations. We found considerably more confounding at the sixth than at the higher grade levels. For example, at the 6th grade from 80 to 90 percent of the variation in ATTUD associated with SCH factors was confounded, whereas at the 12th grade this dropped to between 50 and 60 percent. The combinations of sets of variables that had the greatest percentage values were "FB, SCH," and "FB, ACHV, SCH." The lowest percentage values were for the ACHV, SCH combination. These results were interpreted as indicating that to the extent that ACHV has a joint effect with SCH on ATTUD, this effect is also manifested in common with FB.

Grade-level changes took place in the percentage of variance in ATTUD that could be uniquely associated with SCH, independently of FB and ACHV. We therefore wondered if any subsets of SCH continued to play the same kinds of explanatory role across grade levels, after ATTUD had been adjusted for its relationship with FB and ACHV by means of partial correlation techniques. The first subsets we examined were those of the five

[17] This mode of analysis was parallel to the one used in the Achievement Study (Mayeske et al., 1972b), where Racial-Ethnic Group Membership figured in the explanation of student-achievement levels.

[18] The implications of this are explored on p. 77.

student body variables and the five teaching staff attributes. These analyses showed that the results for the other grade levels were remarkably similar to those already obtained at the ninth grade: values for the set of five teacher attributes ranged from negligible to zero, while those for the set of five student body variables were overwhelmingly large. This does not mean that teaching staff attributes have no influence on Attitude Toward Life. It does mean, however, that that influence is at best small, as well as completely confounded with the student body's level of motivation and achievement.

Finally, we asked which aspects of the set of five student body variables might be wielding the largest explanatory role. We found that by far the largest explanatory role was played by Student Body's Attitude Toward Life. However, the unique role of the other four student body variables was large enough to show that their explanatory role was substantial.[19]

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[19] Regional results for the above analyses were not sufficiently stable to permit inferences about regional trends.

7. Synthesis and Recommendations

In this chapter we shall attempt to integrate the major findings from each chapter, and dwell on some of their possible implications. The method of presentation will be a sequence of questions and answers. Since the background work for this study has been described in chapter 1 (not to mention the earlier studies referred to there), we will not deal with it further. Similarly, we will present no more of the results obtained with our commonality model, not because we consider them unimportant, but rather because they have been dealt with extensively in the preceding chapters, where they helped us formulate the summary analyses referred to here. Our first major task, however, will be to review briefly the purposes of this study and the assumptions on which it is based.

To put it simply, we wanted to learn more about the nature of the variable that, as a result of previous studies, we have come to call Attitude Toward Life. In particular, we wanted to study the ways in which it was related to certain other attributes of the student as well as to attributes of the school he attended. Moreover, we wanted to study the influence of these attributes both singly and in combination with one another.

There were at least two reasons why we chose Attitude Toward Life for further study. First, both common sense and behavioral research confirm that belief in one's ability to influence his life circumstances is an important factor in determining whether or not he actually tries to influence them—and how much. Second, we had found a rather substantial relationship between Attitude Toward Life and level of academic achievement *before any other factors were taken into account.* Moreover, it continued to have such a relationship even after we had taken account of all other family background and school factors.

Let us look in some detail, then, at the meaning of the variable called Attitude Toward Life. Actually, it is not one variable but a weighted composite of some 11 attitudinal items that were found to correlate with one another in our earlier work.[1] A student with a high score on this composite feels that people who accept their condition in life are not necessarily happier, and that hard work is more important for success than good luck. He also believes that if he tries to get ahead he won't encounter obstacles, and that with a good education he won't have difficulty getting a job. He would not sacrifice everything to get ahead, nor would he want to change himself. He does not think he would do better if his teachers went more slowly, and he does think people like himself have a chance to be successful. It is important to emphasize once more that all these items are related; this much is certain on statistical grounds, although we lack data for a behavioral explanation. Nevertheless, we have learned much from the nature of our variable's correlates, to which we now turn.

7.1. GROUP DIFFERENCES IN ATTITUDE TOWARD LIFE

Our first summarizing question is: How do the different groups of interest to us differ in their average Attitude Toward Life? The reference is to groups of students who differ by virtue of race and ethnicity, sex, and region of residence.[2]

For each racial-ethnic group we computed an average of their scores on Attitude Toward Life (ATTUD). For most groups, these averages showed a high degree of consistency across grade levels. But there were variations that were difficult to interpret: for example, whites consistently scored highest and Orientals next highest, while Puerto Ricans scored consistently lowest. The Indian and Mexican-American students were usually intermediate, while Negro students showed a progressive decline at the higher grade levels.[3] Consistency and variation were both difficult to interpret because of differential dropout rates. For example, whites and Oriental-Americans had lower dropout rates than the other groups, while Indians and Mexican-Americans were said to have a higher dropout rate from the fifth grade onwards than either Negroes or Puerto Ricans. Consequently, the decline evidenced by Negroes may well reflect the proportionately greater loss of students from the other minority groups.

If this had been a longitudinal study and all students tested at the sixth grade had been followed up 3 and 6 years later, whether they were still in school or not, very different results might have been obtained. Indeed, the results for the successive grade levels might have more nearly resembled those actually observed at the sixth grade. In other words, it seems likely that Attitude Toward Life is an attribute that becomes fairly stable by the sixth grade. Just when it stabilizes (presumably earlier than the sixth grade) we can only speculate. This topic is further explored on page 85.

In order to overcome the difficulties of interpretation caused by these grade-level fluctuations, we averaged the group means per grade. The results showed that whites scored highest, with Oriental-Americans about one-third of a standard deviation below them. Indian, Mexican-American, and Negro students were about one-half a standard deviation below the whites, while Puerto Rican students, who were lowest of all, were almost one full standard deviation below them. There were also consistent but minor sex differences, with females scoring higher than their male counterparts in each group. However, the average difference in Attitude Toward Life among racial-ethnic groups was about twice as great as the average differences within each group by sex.[4]

For ninth-grade students we also examined differences in Attitude Toward Life for different regions of the country.[5] We found that the same results already observed for students at each grade level tended also to be observed within each region. However, there were some regional fluctuations. For example,

[1] See especially chapter 3 of the School Study (Mayeske et al., 1972a).

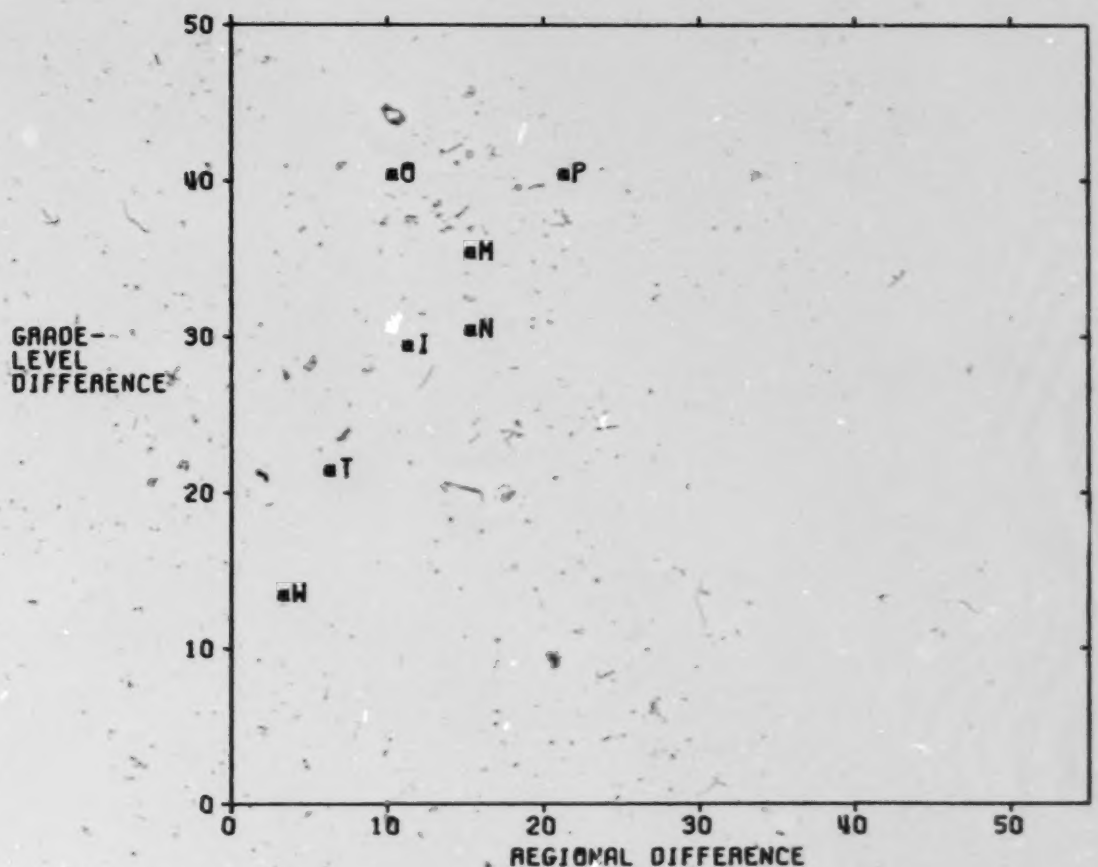
[2] Analyses of regional differences can be found in chapters 3, 5, and 6.

[3] See chapter 6, figure 6.1.

[4] Systematic and consistent differences in the standard deviations of Attitude Toward Life were noted for all grade levels. Thus males were more variable than females and whites were less variable than members of the other racial-ethnic groups (see chapters 2 and 6).

[5] See chapter 3.

FIGURE 7.1. - FLUCTUATIONS IN THE PERCENTAGE OF VARIATION IN ATTITUDE TOWARD LIFE ASSOCIATED WITH FAMILY BACKGROUND AND ACHIEVEMENT MEASURES



LEGEND

I - INDIAN
M - MEXICAN
P - PUERTO RICAN
N - NEGRO
O - ORIENTAL
W - WHITE
T - TOTAL

GRADE-LEVEL DIFFERENCE--LARGEST PERCENT MINUS SMALLEST PERCENT

REGIONAL DIFFERENCE --LARGEST PERCENT MINUS SMALLEST PERCENT

Indian students trailed their white counterparts to a greater extent in the North than in the South, while the opposite was true of Mexican-American, Puerto Rican, and Negro students (that is, there was a slight tendency for this gap to be greater in the South than in the North). Oriental students scored slightly further below whites on the west coast than on the east coast.

Females in most of the regions were found to have a slightly higher score on Attitude Toward Life than males. The largest mean difference across regions, irrespective of sex, was observed for Puerto Ricans, while the minimum difference was for Orientals. At times the extent to which students within each of the groups other than whites differed across regions approached the extent to which they differed from the whites. To give an indication of this we divided the maximum regional difference for each group by the magnitude of its difference from the whites. The resulting values were (roughly): two-thirds for Mexica

[1] I.e., the regional "sigma gap" from table 3.6 (p. 30), divided by the group's deviation from whites in sigma units, where the means are average of the 3 grade levels computed from figure 6.1 (p. 60).

Americans, Puerto Ricans, and Negroes; two-fifths for Indians; and one-third for Orientals.

Since there are consistent and at times substantial differences among these groups, as well as substantial differences among students within each of these groups, let us examine the kinds of factors that were found to play a role in explaining these differences.

7.2. THE DEPENDENCE OF ATTITUDE TOWARD LIFE ON FAMILY BACKGROUND AND ACHIEVEMENT

Our next summarizing question is: To what extent is Attitude Toward Life associated with (or explained by) Family Background and Achievement, and how does the percentage of variation explained fluctuate by region of residence and grade level?[7] We found that at the ninth grade Attitude Toward Life was more dependent upon, or highly associated with, Family Background (FB) and Achievement (ACHV) for groups other than whites. This was also true at the other grade levels, although there were considerable fluctuations across grade levels and regions: for example, progressively smaller values were observed at the higher grade levels. Figure 7.1 is an attempt at summarizing these fluctuations by subtracting the smallest from the largest regional value for each group, and plotting the percentage of variance explained by FB and ACHV against the difference between the largest and smallest grade-level values. It will be seen that the grade-level differences were much greater than the ninth-grade regional differences. Moreover, groups for whom the grade-level differences were large tended also to be those for whom the regional differences were large. The main exception was the Oriental-American group, which showed relatively greater grade level than regional variability. At the ninth grade the absolute values of these percentages for each group were (in descending order): Negro, 34; Oriental, 33; Puerto Rican, 32; Mexican, 30; Indian, 29; and white, 28. Hence, there is a slight tendency for groups with high percentages at the ninth grade to have considerable regional and grade-level variability as well.

There were also considerable regional and grade-level fluctuations by sex. In most regions, males showed larger percentages than females. However, the reverse was true for Mexican-American and Puerto Rican students, while for Indian Americans the extent to which the percentage was larger for males appeared to depend on the nature of the regional group. Sex differences in percentages across grade levels were rather erratic and did not lend themselves to any succinct summarization.

7.2.1. The Role of Family Structure and Stability in Attitude Toward Life

Having seen that the role of Family Background and Achievement in Attitude Toward Life was usually smaller for whites than for the other groups, we may well ask if the explanatory role of individual measures in the family background fluctuates in the same way. We will first focus on the role of the index called Family Structure and Stability (FSS) as it relates to Attitude Toward Life (ATTUD). Our main hypothesis was that the presence or absence of key family members might play a critical role in the development of ATTUD.[8] We did indeed find substantial grade-level differences in the role of FSS in ATTUD; for instance, its role was greater at the sixth than at the higher grade levels. The latter effect was traced to three factors:

1. The changing nature of the sample at the higher grades.
2. The somewhat different nature of the indices at the sixth grade as compared with those at the higher grade levels.
3. Perhaps real changes as well.

Since we cannot separate out the effects of one trend from the other, we have summarized the grade-level trends for the different groups. Figure 7.2 presents the squared correlation of FSS with ATTUD both before and after a number of conditions have been allowed for. These conditions are:

"NONE."—This is the squared correlation of FSS with ATTUD before any other factors have been allowed for.

"SES."—This is the squared correlation of FSS with ATTUD after differences among students in their Socio-Economic Status (SES) have been allowed for. It is computed by subtracting from the squared correlation of both SES and FSS with ATTUD (i.e., R-SQ(SES,FSS)) the squared correlation for SES only (i.e., R-SQ(SES)). In earlier chapters this value was called the *unique role* (i.e., U(FSS) = R-SQ(SES,FSS) − R-SQ(SES)). It represents the association of FSS with ATTUD after the association of SES with ATTUD has been taken out. This same rationale is followed for the remaining adjustments.

"SES, ACHV."—This is the percentage of variation in ATTUD associated with FSS after the differences in ATTUD associated with SES and ACHV have been allowed for (i.e., U(FSS) = R-SQ(SES,ACHV,FSS) − R-SQ(SES,ACHV)).

"FB, ACHV."—This is the percentage of variation in ATTUD associated with FSS after the differences in ATTUD associated with ACHV and FB have been allowed for.

"FB, ACHV, SCH."—This is the percentage of variation in ATTUD associated with FSS after FB, ACHV, and the 10 school factors have been allowed for.[9]

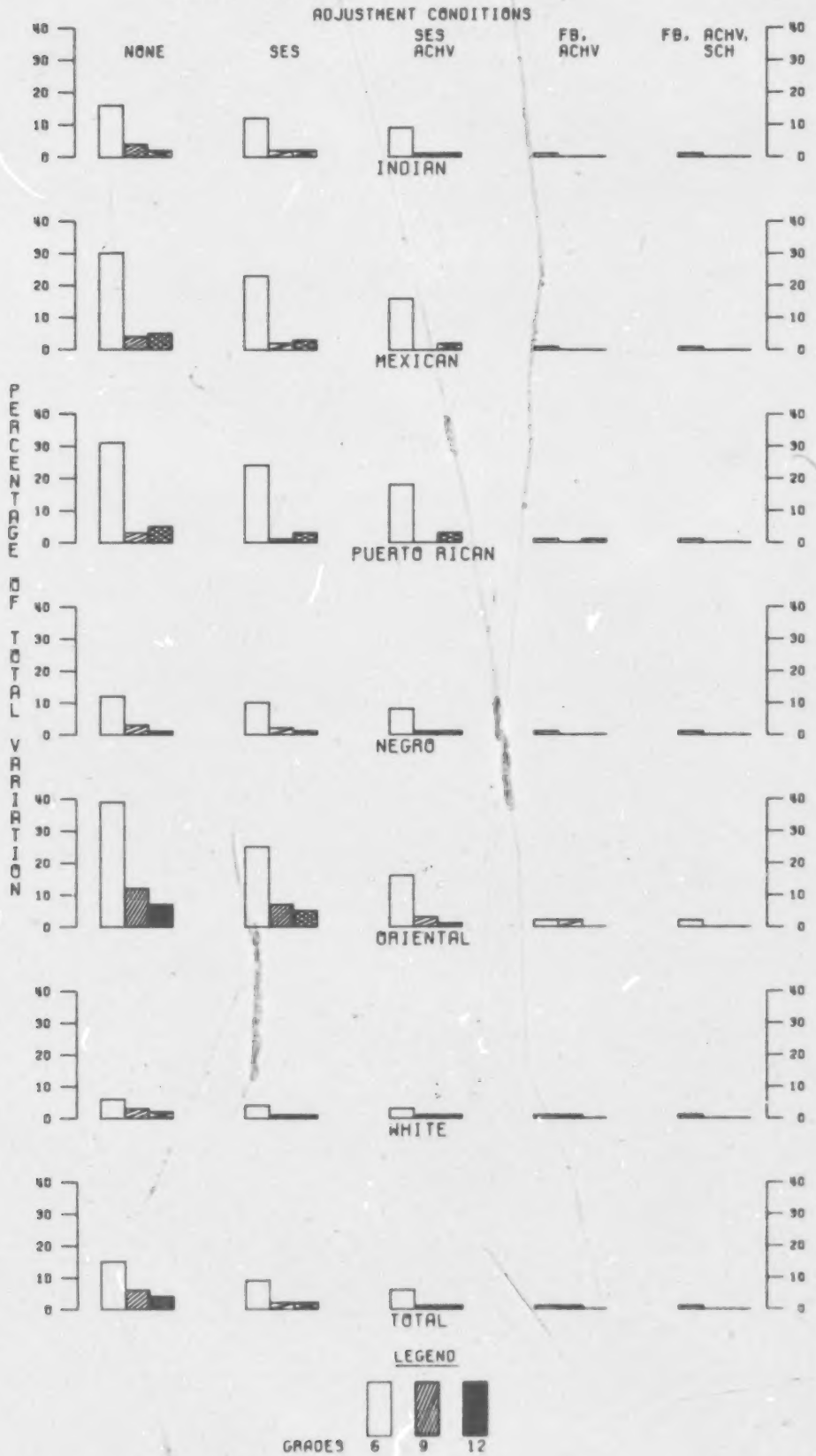
It will be seen from the "none" column in figure 7.2 that before any conditions have been allowed for the percentage of variation in ATTUD associated with FSS is much larger at the sixth than at the other grade levels. However, after SES is allowed for (the "SES" column) these values all drop considerably, although the sixth-grade value is still larger than any of the others. After SES and ACHV have been allowed for (the "SES, ACHV" column) another drop occurs. However, the "FB, ACHV" column shows that after ACHV, SES, and the other variables pertaining to the motivational and attitudinal aspects of family life have been allowed for, the percentages become more nearly equal. Finally, after differences among students in the type of school they attend have also been allowed for (the "FB, ACHV, SCH" column), these percentages are all either zero or near zero in value (except for Oriental-Americans). Consequently, although the magnitude of the role played by

[7] Family Background consists of Socio-Economic Status, Family Structure and Stability, Expectations for Excellence, Educational Plans and Desires, and Study Habits, as described in chapter 1.

[8] The index we called Family Structure and Stability consisted of items relating to the presence or absence of key family members in the home, amount of time the mother works outside the home, and similar factors.

[9] The 5 student body and 5 teaching staff variables that make up School (SCH) are described on pp. 5–6.

FIGURE 7.2. - PERCENTAGE OF TOTAL VARIATION IN ATTITUDE TOWARD LIFE ASSOCIATED WITH FAMILY STRUCTURE AND STABILITY INDEPENDENT OF FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS



FSS in ATTUD is much greater at the sixth than at the other grade levels, these grade-level differences become more nearly equal after a number of background conditions have been allowed for. We are therefore inclined to conclude that to the extent that FSS plays a role in ATTUD it does so in cooperation with, rather than independently of, these other factors.

ATTUD also showed a slightly greater sensitivity to FSS for ninth-grade males than for females. But at the other grades these results were somewhat erratic.[10]

7.2.2. The Role of Family Process Factors in Attitude Toward Life

There is little doubt that Family Structure and Stability, as it relates to Attitude Toward Life, depends on other factors. We therefore wondered if parent-child involvement rather than the presence or absence of key family members might be a more important consideration in explaining differences among students in their Attitude Toward Life. In order to indicate the nature of this involvement we used a set consisting of Expectations for Excellence, Study Habits, and Educational Plans and Desires. These, we felt sure, reflected the expectations and aspirations that a student and his parents had for his school performance, as well as the activities they engaged in to support these aspirations. That is why we called the set Family Process (PRCS). We found that it played a large role in Attitude Toward Life (ATTUD), both before and after other aspects of the student's background were allowed for. Extended analysis showed that although PRCS played a larger role in ATTUD at the sixth than at the higher grade levels, it continued to play a substantial role for all levels even after differences among students in their Socio-Economic Status, Family Structure and Stability, Achievement, and school attributes had been taken into account. We have presented summary analyses of these trends in figure 7.3. The computational rationale here is similar to that outlined for figure 7.2. The various adjustment conditions are:

"NONE."—This is the squared multiple correlation of PRCS with ATTUD before any other background conditions have been allowed for.

"SES."—This is the squared multiple correlation of PRCS with ATTUD after the relationship of Socio-Economic Status with ATTUD has been allowed for. These percentages are often called the *unique contributions* (i.e., U(PRCS) = R-SQ(PRCS, SES) − R-SQ(SES)).

"HB."—This is the squared multiple correlation of PRCS with ATTUD after both SES and FSS have been allowed for (i.e., U(PRCS) = R-SQ(HB,PRCS) − R-SQ(HB)).[11]

"HB, ACHV."—This is the squared multiple correlation of PRCS with ATTUD after both HB and ACHV have been allowed for.

"HB, ACHV, SCH."—This is the squared multiple correlation of PRCS with ATTUD after HB, ACHV, and the set of 10 school variables (SCH) have been allowed for.

It will be seen from the "NONE" column in figure 7.3 that these percentages decline progressively at the higher grade levels. They also tend to be smaller for whites than for the other groups. As the different background conditions are taken into account the percentages tend to decline in a progressive manner for each group. However, even after all these conditions have been allowed for the set of PRCS variables still has a fairly substantial role in ATTUD. The magnitude of this role depends upon the group and grade level: once again it is smaller for whites than for the other groups, and smaller at the higher than at the lower grades. But the percentage that remains is large enough for us to conclude that PRCS does indeed play an important role in the differences observed among students in ATTUD, and perhaps in the development of these differences as well. Of course, the other background conditions also play a substantial role, as is evidenced by the reduction in the percentages that they produce. Analyses in chapters 2 and 3 showed that about one-third to one-half of the variation in ATTUD associated with PRCS was also associated with HB and ACHV.[12] Another smaller portion of about 10 percent was attributable to ACHV.[13] Finally, as we shall see in the next section, a portion was attributable to the type of school attended.

We also noted that across regions of the country the role of PRCS factors in ATTUD tended to exceed that of HB and ACHV for every group. There was, however, a large percentage that was inseparable from them.[14] We found that ATTUD, relative to these other factors (i.e., HB and ACHV), showed a greater sensitivity to the set of PRCS factors for boys than for girls in a preponderance of the regions.

We also investigated various aspects of the PRCS set to see which ones might be playing the greatest role in ATTUD. In order to do this we separated Family Process into two sets, one consisting of Educational Plans and Desires (EDPLN), and the other of Expectations for Excellence together with Study Habits. We called the second set Other Motivational Measures (OTHER); one way to distinguish it from the first set is to say that it pertains to the more immediate kinds of parent-child involvement. Analyses by group and grade level showed that the role of OTHER always substantially exceeded that of EDPLN. However, there was often a substantial portion of ATTUD that was shared by these two sets. Nevertheless, the magnitude of the role played by OTHER was sufficiently large and stable across groups and grade levels for us to conclude that, of the PRCS measures, this subset played the greatest explanatory role. We are therefore inclined to conclude that it is the more immediate kinds of parent-child involvement that play a role in shaping ATTUD.

Regional and sex differences in these relationships were found to depend upon the particular region and racial-ethnic-sex group under consideration. In other words, these results did not lend themselves to any succinct generalizations.

7.3. THE ROLE OF SCHOOL FACTORS IN ATTITUDE TOWARD LIFE

Our third and last summarizing question is: What kind of role is played in a student's Attitude Toward Life by the school he attends?[15] In order to represent different aspects of the school

[10] These analyses were conducted for chapter 6. However, because of their large number and somewhat erratic nature, they were not presented.

[11] Home Background (HB) consists of Socio-Economic Status combined with Family Structure and Stability.

[12] This is another way of saying that they were inseparable to this degree in their possible effects.

[13] See table 2.11, p. 23.

[14] This was the percentage common to both HB-ACHV and PRCS (about half). See table 3.4, p. 29.

[15] This is, roughly speaking, the ground covered by chapters 4, 5, and 6.

FIGURE 7.3. - PERCENTAGE OF TOTAL VARIATION IN ATTITUDE TOWARD LIFE ASSOCIATED WITH FAMILY PROCESS MEASURES INDEPENDENT OF OTHER FAMILY BACKGROUND, ACHIEVEMENT, AND SCHOOL FACTORS

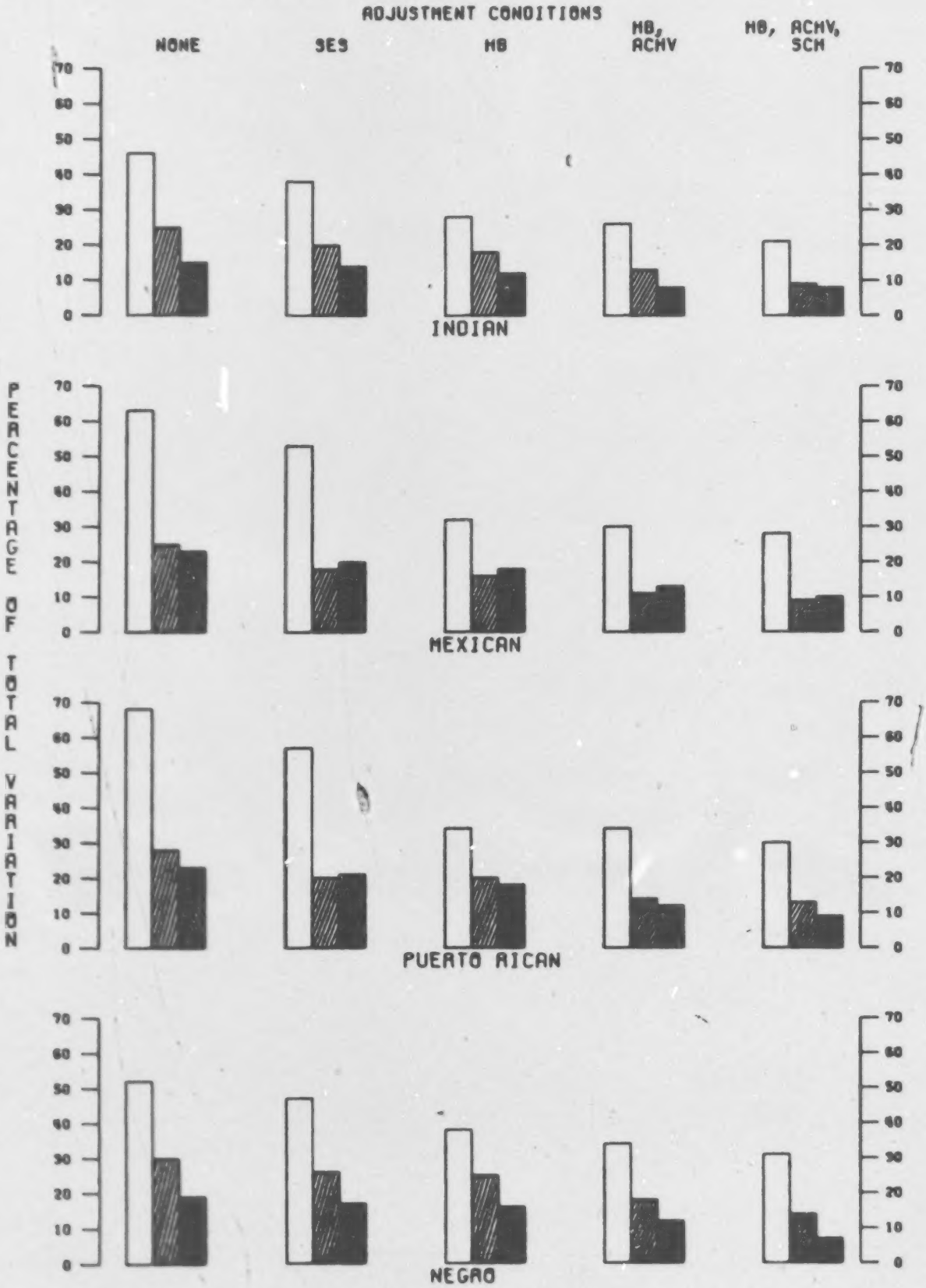
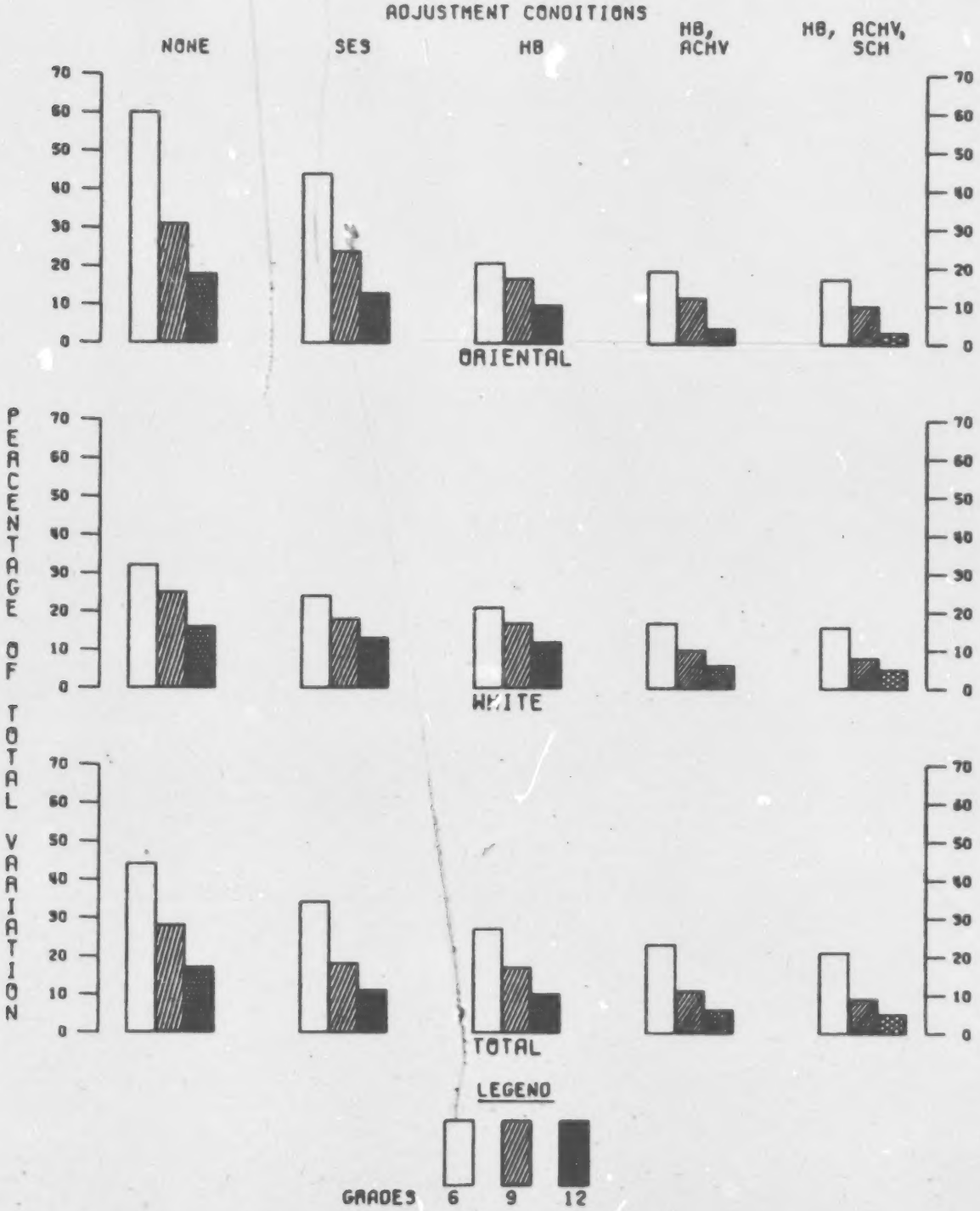
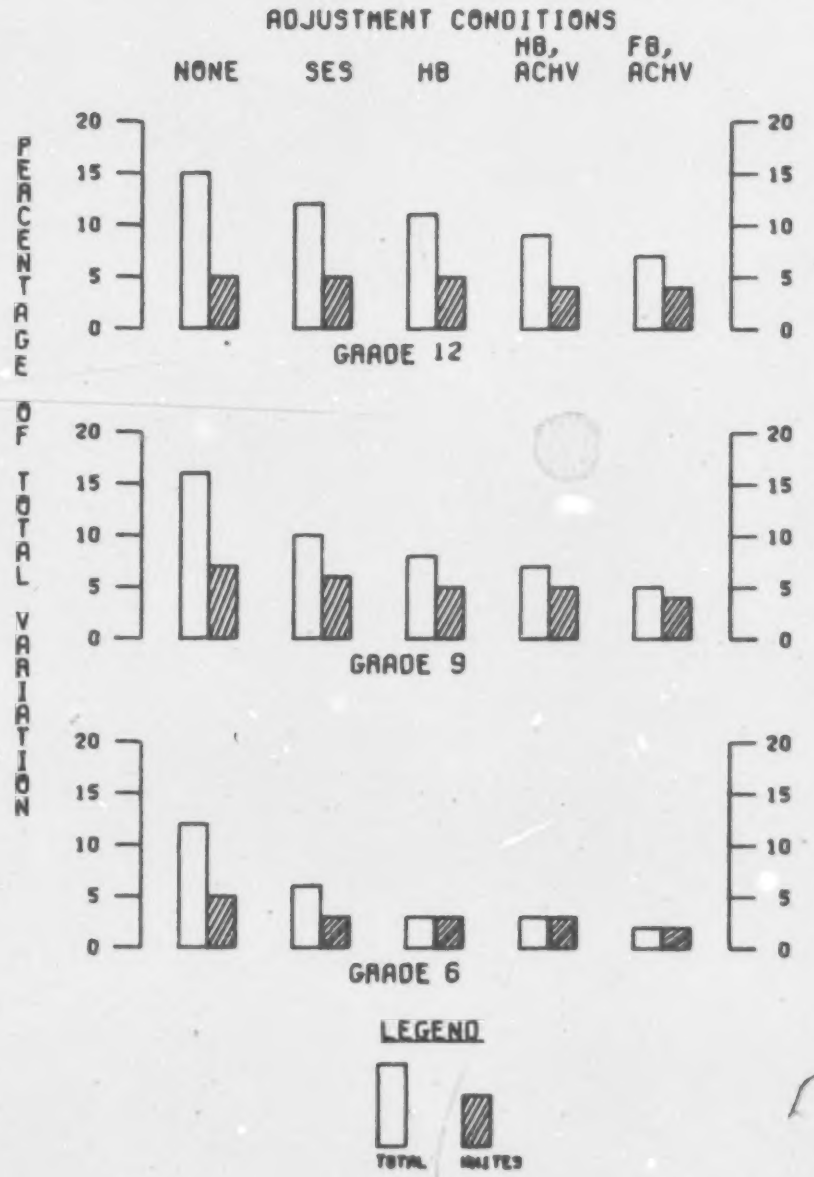


FIGURE 7.3. - CONTINUED



we used a set of 10 variables called School (SCH). Five of the 10 pertained to the achievement and motivational levels of the student body. As a set they were called Aggregate School Outcomes because, by virtue of their high correlation with a comprehensive set of school variables, they represented the aggregate effects of schooling. Since they were also highly correlated with the social composition of the student body, and since school attendance areas, at the time the data were collected, were generally determined by residential boundaries, they also represented the effects of residential and school segregation. The set of five teaching staff variables consisted of the staff's training and salary levels, their verbal skills, their view of their teaching

FIGURE 7.4. - PERCENTAGE OF TOTAL VARIATION IN ATTITUDE TOWARD LIFE ASSOCIATED WITH SCHOOL FACTORS INDEPENDENT OF FAMILY BACKGROUND AND ACHIEVEMENT



conditions, their preference for working with students of different ability levels, and their racial-ethnic composition. These latter five variables were shown to mediate between student input and aggregate school outcomes.[16]

In chapter 5 as well as in an earlier work (Mayeske et al., 1972b) we used this set of variables for analyses by racial-ethnic group and for all students combined. However, we noted that there were substantial differences between the schools attended by whites and those attended by minority group students—differences on a range of variables that are of interest to us (Mayeske et al., 1972a). Consequently, we have chosen to emphasize results obtained when all students are included in the same framework.

We first wondered what the magnitude of the association of School (SCH) with Attitude Toward Life (ATTUD) would be for different grade levels and regions of the country, and then how this might change as different aspects of the student's background were taken into account. We found that the percentage of variation in ATTUD associated with SCH was slightly greater at the ninth than at the other grade levels, and was uniformly greater in the South than in the North. For all regions and grade levels, SCH continued to have an association with ATTUD even after FB and ACHV had been allowed for. Figure 7.4 is intended to summarize these analyses by grade level. In order to highlight the differences between whites and all other

[16] See chapter 1 for more details on these variables, and the School Study (Mayeske et al., 1972a) for the analyses.

students, we have included two kinds of analyses: those for all students combined, and those for whites alone. The various background conditions are:

"NONE."—This is the association of the 10 school factors with ATTUD before any other background conditions have been allowed for.

"SES."—This is the association of the 10 school factors with ATTUD after differences among students in their SES have been allowed for.[17]

"HB."—This is the association of the 10 school factors with ATTUD after HB (i.e., SES and FSS) has been allowed for.

"HB, ACHV."—This is the association of the 10 school factors with ATTUD after HB and ACHV have been allowed for.

"FB, ACHV."—This is the association of the 10 school factors with ATTUD after HB, ACHV, and PRCS (i.e., EXPTN, HBTS, and EDPLN) have been allowed for.[18]

There are a number of points worthy of note in figure 7.4. First, the percentage of variation in ATTUD associated with SCH before any other factors have been allowed for is 2 to 3 times greater for all students combined than it is for whites. Second, as more and more of the different background conditions are allowed for, the absolute value of these percentages becomes smaller. So do their respective differences in magnitude. For example, after differences among students in FB and ACHV have been allowed for (the "FB, ACHV" column), the percentages are equal or nearly equal at the 6th and 9th grades, while at the 12th grade the percentage for whites is about half that for all students combined. The magnitude of these remaining values indicates that there may well be some unique influence of the school on an individual student's outlook. When these values are compared with the initial ones they indicate that much of the variation in ATTUD associated with SCH is confounded with the individual student's FB and ACHV. For example, at the 6th grade for all students combined almost all this variation is thus confounded, while at the 12th grade this applies to only about half of it. Analyses of this confounding showed that the largest proportion of the variation in ATTUD associated with SCH was inseparable from ACHV. These results led us to conclude that to the extent that ACHV had a joint effect on ATTUD with SCH, this effect was also manifested in common with FB.

Since there continued to be an association of school factors with ATTUD even after FB and ACHV had been allowed for, we wondered if some subsets of these factors might be playing a greater role than others. Accordingly, after first adjusting ATTUD for its relation with FB and ACHV, we conducted separate analyses of the five student body and five teaching staff attributes that we described earlier. These analyses showed that the role played by the teacher attributes was almost completely confounded with that played by the set of student body attributes. On the other hand, the set of student body attributes had a large role that was independent of the teaching staff attributes. This does not mean that the teaching staff attributes had no influence on ATTUD. But such influence as could be detected was small, and was almost completely confounded with the five student body variables.

Our next task was to discover which aspects of the set of five student body variables were exerting the greatest explanatory role. Our analyses showed that, of the five, Student Body's Attitude Toward Life played the largest explanatory role. However, the unique role of the other four student body variables combined was large enough to be thought of as playing a substantial role.

7.4. SUMMARY OF FINDINGS

The preceding sections will be summarized here in as succinct a manner as possible by means of a series of findings. The term "finding" is used to denote results that should be thought of more as hypotheses, subject to further investigation through longitudinal and experimental studies, rather than as firm conclusions. Emphasis will be given to results that are stable across grade levels and regions.

Finding 1.—Students who identified themselves as being white tended to score higher on Attitude Toward Life (ATTUD) than did students who identified themselves as belonging to some other group. Of these latter, Oriental-Americans scored on the average one-third of a standard deviation below whites, Puerto Ricans almost one full standard deviation below, and the remaining groups (Indians, Mexican-Americans, and Negroes) one-half a standard deviation below.

(*a*) Mexican-American, Puerto Rican, and Negro students differed across regions of the country by two-thirds of the extent to which they differed from whites. Comparable values for Indians and Oriental-Americans were two-fifths and one-third, respectively.

(*b*) For each of the six racial-ethnic groups studied, females scored consistently higher on ATTUD than males. The difference, however, was only on the order of one-fourth of a standard deviation or less.

(*c*) Differences among the racial-ethnic groups in their average ATTUD were about twice as great as were differences between the sexes within each group.

Finding 2.—The extent to which Attitude Toward Life (ATTUD) could be explained by Family Background (FB) factors and Achievement (ACHV) tended to be greater for all minority groups than for whites.

(*a*) At the ninth grade slightly more than one-fourth of the differences among whites in their ATTUD could be explained by FB and ACHV, while the comparable value for the other groups was nearer to one-third. These values were higher at the 6th grade and lower at the 12th grade.

(*b*) Differences between the sexes on these variables were not consistent across groups, regions, and grade levels.

Finding 3.—An index called Family Structure and Stability (FSS), because it reflected the presence or absence of key family members in the home, was found to have a low-to-moderate relationship with Attitude Toward Life, depending upon the group and grade level. However, after differences in the student's

[17] The same computational rationale is used here as was used earlier, viz: U(SCH) = R-SQ(A,SCH) − R-SQ(A), where A is the variable or set of variables being allowed for.

[18] Family Background consists of Home Background combined with Family Process.

Family Background, Achievement, and type of school attended had been allowed for, this relationship vanished. Consequently, to the extent that Family Structure and Stability plays a role in Attitude Toward Life, it does so in conjunction with these other background variables.

Finding 4.—A set of three variables called Family Process (PRCS), because it represented both the expectations and aspirations that a student and his parents had for his schooling and the activities that they engaged into to support these aspirations, was found to have a moderate-to-high relationship with Attitude Toward Life (ATTUD) which persisted, albeit in reduced size, after the student's Socio-Economic Status (SES), Family Structure and Stability (FSS), Achievement (ACHV), and type of school attended had been allowed for.

(*a*) Roughly speaking, one-third to one-half of the differences among students in ATTUD that was associated with PRCS was also associated with SES, FSS, and ACHV. Some 10 percent more was associated solely with ACHV, while yet another smaller portion was associated solely with the type of school attended.

(*b*) ATTUD showed a slightly greater sensitivity to the set of PRCS factors for boys than for girls.

(*c*) Of the three PRCS variables, the two that pertained to the more immediate kinds of parent-child involvement played a greater independent role in ATTUD than did their longer range educational and occupational aspirations. This was true even though there was a substantial portion of ATTUD that was shared by them both.

Finding 5.—Roughly 12 to 16 percent of the differences among students in their Attitude Toward Life (ATTUD) was associated with a set of 10 school factors. After other aspects of Family Background (FB) and Achievement (ACHV) had been allowed for, these values dropped to between 2 and 7 percent. Hence, to the extent that the type of school one attends plays a role in ATTUD, it may be thought of as having a large cooperative role with FB and ACHV, and another, somewhat smaller role that is independent of both these variables.

(*a*) The degree to which school variables were associated with ATTUD before other background factors had been allowed for was uniformly greater in the South than in the North.

(*b*) After examining subsets of the 10 school variables, we found that the 5 pertaining to the student body's achievement and motivational level had a large role in ATTUD that was independent of the 5 teaching staff attributes. The role of these latter, on the other hand, was completely confounded with that of the five student body variables.

(*c*) Of the five student body variables, Students' Attitude Toward Life had the largest independent role in explaining *individual* student differences in ATTUD. However, the other four variables showed an independent role large enough to support the conclusion that they, too, had an influence.

7.5. INTERPRETATION OF FINDINGS

In this section we shall speculate about the meaning of the findings and their possible implications. We have seen that, of the variables we have worked with, some classes have a stronger association than others with an individual student's Attitude Toward Life (ATTUD). Further, when placed in the analysis together, these different classes of variables were often found to share a good deal in common with one another as they related to ATTUD. Such "commonness" implies that, in a dynamic framework (viz, over a sequence of time periods), these classes of variables may stand in a reciprocal causal relationship with each other. Let us see, then, if we can, on the basis of our findings, hypothesize what the nature of this relationship might be, and how it might help us understand the development of a student's outlook on life.

It may be as well to recall at this point the classes of variables we have worked with and the variables that comprise them.

Home Background (*HB*).—This set consists of Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership. These three variables can be thought of as a set that locates a student and his family in terms of the social structural aspects of society. Family Structure and Stability is included here because an earlier study has shown it to be highly confounded with Socio-Economic Status in its relationship with Attitude Toward Life as well as in its relationship with Achievement (Mayeske et al., 1972b). Racial-Ethnic Group Membership is included here because this is a factor of proven relevance to a student's chances in life even after his Socio-Economic Status and Family Structure have been allowed for (Mayeske et al., 1972b).

Family Process (*PRCS*).—This set consists of the three variables that pertain to the expectations and aspirations that a student and his parents have for his schooling, and to the activities they engage in to support these aspirations.[19]

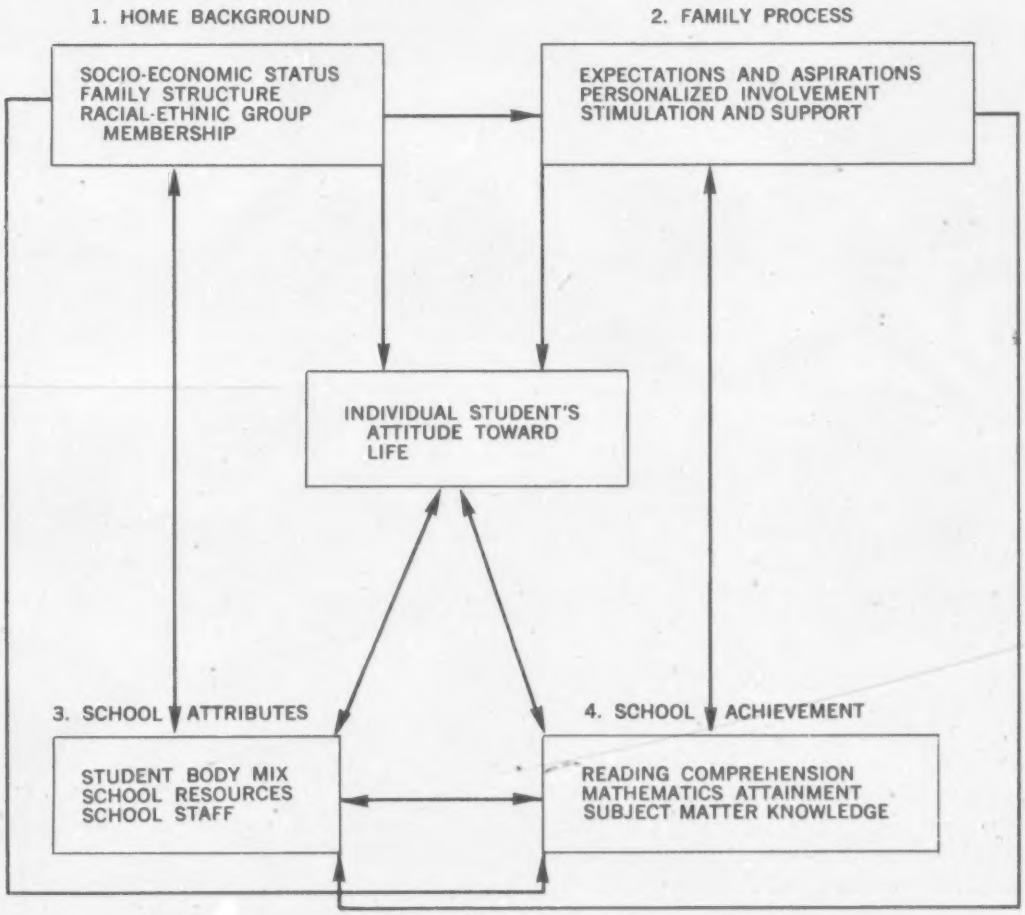
Achievement (*ACHV*).—This set consists of measures of the student's academic skills and of his attainments in reading and mathematics.

School Attributes (*SCH*).—This set consists of attributes of the students one goes to school with, as well as attributes of the teaching staff at that school. The five variables that reflect the student body's achievement and motivational levels are classified as school variables not only because they help to shape the school's policies and practices, but also because they can be regarded as reflecting the aggregate effects of schooling. The five teaching staff attributes are included here because they have been shown to be crucial in mediating between student inputs to the school and aggregate school outcomes (Mayeske et al., 1972a, chapter 6).

On the basis of our findings then, how do we see these classes of variables acting on Attitude Toward Life and on one another over time? We see two aspects of a student's family, represented here by Home Background and Family Process, as having a formative influence on a wide number of his attributes even prior to his conception. For example, individuals of similar socioeconomic status and racial-ethnic group membership are more likely to marry and have offspring than are individuals who are dissimilar in these respects. Likewise, it seems reasonable to assume that individuals who place great value on education and

[19] The 3 variables are Expectations for Excellence, Study Habits, and Educational Plans and Desires.

FIGURE 7.5.—Current Conceptualization of the Roles of Family Background, Achievement, and School Factors in Attitude Toward Life



believe that their children can attain a better life through it, or at least maintain their present way of life, are more likely to marry each other than those who do not. Thus, by the time a child appears on the scene, an initial sharing of educationally related values has already taken place in the family.[20]

These shared values, together with the material resources of the home, will shape the number and nature of the activities that parents engage in with their children. They will also affect the parents' choice of a place to live, which in turn will affect the social composition (not to mention the facilities) of the school the child attends. Racial-ethnic group membership is an additional factor, since the type of housing available to nonwhites is governed by various discriminatory practices, as (in consequence) is the type of schooling. By the time a child is of school age, he will already have had the familial and community educational values communicated to him (or not communicated to him) through a variety of experiences involving parents, or parental surrogates, and peers. For example, reading to a child when he is of preschool age is one parental activity that serves to promote academic achievement, and that serves also to shape his Attitude Toward Life.[21]

Consequently, we can think of all these factors, including Attitude Toward Life, as mutually acting on each other over time. In similar manner, once the child goes to school the achievement and motivational levels of the students he goes to school with, including their collective Attitude Toward Life, will influence his own Attitude Toward Life both directly and indirectly. As an example of direct influence, consider the belief of his fellow students about their ability to influence their lives through the avenue of education. Undoubtedly, this will have an effect on a student's own beliefs in this regard. As an example of indirect influence we may take the achievement levels of his fellow students, which will define the meaning of his own achievement level and thus affect his Attitude Toward Life.[22] Similarly, the views of the teaching staff as to a student's or

[20] The extent to which these shared attributes are related to genetic factors is an unknown whose resolution would require a very different kind of study (for a discussion, see Jinks and Fulker, 1970).

[21] It seems possible that it may not be so much the nature of the activity that is critical in shaping ATTUD but rather that the activity serves as a vehicle for the transmission of affect. Here, too, is an area that urgently needs investigation.

[22] For example, a student who attains an unusually high or low achievement level relative to that of his peers may develop an unusually optimistic or pessimistic outlook on life.

class of students' life chances will also affect the students' own views in this regard.

A graphic summary of these relationships is given in figure 7.5. In this figure we have indicated by arrows the direction of the linkages or mutual influences already discussed. An arrow pointing in both directions indicates that we see the classes of variables as interacting with one another. An arrow pointing in one direction indicates that the influence of this class of variables is seen as one-way. The entire complex of mutual influences can be summarized as a matrix in which the rows denote the classes of variables that are having an influence ("from"), and the columns the classes of variables that are being influenced ("to"). The numbers represent the boxes from figure 7.5.

FROM	TO: 1	2	3	4	5
1. Home Background		X	X	X	X
2. Family Process	0		X	X	X
3. School Attributes	0	X		X	X
4. School Achievement	0	X	X		X
5. Attitude Toward Life	0	X	X	X	

An "X" indicates that the row variable influences the column variable; a zero indicates that there is no influence of the row variable. The diagonals have been left blank since there was no way in this model to conceive of a variable as influencing itself. It will be seen that Home Background influences all the other sets of variables but is not influenced by them. The other sets, however, all have an influence on one another.

We would have liked to estimate the strength of these relationships. However, to do this we would have needed data from several time periods on the same students, and such data were not available. Also, we have not even touched on a number of other classes of variables that, in our opinion, would have to be introduced before we could give a really adequate portrayal of how Attitude Toward Life develops. We mean such factors as religious preference, discrimination in housing and employment, community variables such as membership in boys' clubs or street-corner gangs, more direct measures of peer-group associations, and many others.

Some of our findings, it will be noted, have been recorded without much attempt at explanation. For example, with regard to differences by sex in average Attitude Toward Life, we suspect that girls score higher than boys because they have a less aggressive approach to life, and don't have the level of aspiration that boys do. However, we were unable to separate out level of aspiration per se. Similarly, the boys' Attitude Toward Life showed a greater sensitivity to Family Process than the girls', but it is hard to say just why this should be so. Similar difficulties arose when we attempted to explain regional differences.

7.6. IMPLICATIONS AND RECOMMENDATIONS

Explanations of the effects of one type of experience on another, such as those of poverty on motivation or achievement, all too often stress a single factor—language, perhaps, or inadequate nutrition—to the exclusion of all others. In the suggestions that follow, we shall attempt to guard against this tendency. As we have seen, there are a myriad of factors that may be interpreted as being involved in shaping Attitude Toward Life. It is true that some of these weigh a little more heavily than others, but none of them is the sole explanatory factor.

First, we should recognize that a student's views about his ability to influence his life chances through the avenue of education probably reflect a degree of accuracy. For example, many parents and students of low socioeconomic status recognize that it would be very difficult for them to divest themselves of this status. This applies particularly to many minority group members, for they perceive additional barriers in the form of discrimination in employment, housing, and schooling. Second, since a student in this position is likely to reside with others like himself, there tends to be some mutual reinforcement of commonly held views.

Another factor, the one we have observed to be most strongly related to an individual student's Attitude Toward Life, is what we have come to call Family Process, or educationally related child-rearing activities. By this we mean such things as the parent's and child's aspirations for his schooling and the activities they engage in to support these aspirations. These activities include reading to him when he was young, talking to him about his schoolwork, studying and watching television an optimum number of hours per day, and so on. We are not suggesting here that there are one or two critical activities that make all the difference. As E. E. Sandis (1970) has pointed out, parents may operationalize and communicate their values in different ways. We do want to suggest, however, that a number of activities do make a difference in shaping both Achievement and Attitude Toward Life. It seems as though this personalized kind of involvement serves not only to stimulate and support the child in his achievement but to shape his outlook as well. We have not investigated this involvement in detail. It would appear, however, that a number of factors such as the intermeshing of verbal sequences (Hess, 1969), sensitization to verbal praise as a reinforcing mechanism, use of incentives, and so forth, may all be involved to differing degrees.

Finally, the organizational and reward structure of most schools may serve to work against the interests of many children, especially (though not only) those from poverty-stricken backgrounds. Elementary schools, in their current form, tend to be organized on the basis of single classrooms of 25 to 35 students with 1 teacher. The latter generally leads the children through some types of lesson as a group while breaking them up into subgroups for others, such as reading instruction. In the latter case, while the teacher works with the smaller group the other children are expected to apply themselves to work at hand and remain quiet. Throughout the schoolday the teacher's medium of instruction is standard English. It is by this means that he or she offers information, guidance, praise, and reproval to the students. In such a system, an individual student's rate of progress and attainment is defined by that of his peers. If he can move more rapidly than they, for whatever reason, then he will be said to be "doing well." If he moves less rapidly, then he is said to "be behind." Perhaps he will be given special attention in an effort to put him on a level with his peers—an effort that may be a source of stigma rather than support. Clearly, in such a setting a child may flounder rather than flourish. He may come from a home in which some language or

dialect other than standard English is spoken, the verbal reinforcements offered by the teacher may not be particularly meaningful to him, the impulse control required of him may not be something to which he can readily adapt, and the skill development of his peers may exceed that of his own. No wonder if he comes to think of himself as one who is "behind," and for whom academic performance offers little in the way of a sense of accomplishment.

Remedying this situation, however, is not an easy task that one can expect to accomplish in a short time period. Several departures from past practices, sometimes quite drastic in nature, may be suggested. First, the performance standard of schools needs to be shifted from one of mastery relative to one's peers to one of mastery relative to a fixed criterion of performance. This implies that educators and consumers of education alike would have to agree on the level of skill desired for different ages and grades of students before they could pass on to the next learning stage. Thus, some students would be considerably ahead of their age-mates in terms of learning stages completed. The emphasis, however, would be on one's own performance, not that of his peers.[23]

A second departure that might prove effective would entail broadening the existing reward structure of schools so as to introduce a number of different kinds of incentives. Examples of such incentives range from the award of special privileges, or the opportunity for such privileges in the form of "credit cards," to the use of more explicit systems of incentive and reward (Lipe and Jung, 1971). The student for whom other approaches are not successful might even be given a variety of so-called reinforcement therapies; that is, personalized treatments in the form of game playing sessions, sustained counseling of a personal nature, and selective participation in appropriate school activities. The use of older students to perform certain teaching and custodial functions, thereby serving as more relevant role models, should not be overlooked.

Third, the performance criteria of schools also need to be broadened. In this and other studies in this series we have focused only on such school outcomes as academic achievement and the desire to continue in school. Other aspects of schooling—the ability to work effectively with others, for instance, or the opportunity for a sense of meaningful accomplishment—may be far more important even though they are more difficult to measure (Cross, 1971). Such ends might best be served by a work-study program that would enable adolescent students to get some of their learning experiences from real-life situations.

[23] Of course, the schools would not be able to pursue individualized instruction in a completely unconstrained manner; the transmission of social skills, for instance, might best be accomplished in groups of children about the same age. Given such a system, more nearly equal educational results could become a reality for diverse social groups. However, the commitment of resources to accomplish these ends would probably be heavier where the need was greatest.

Finally, it has been argued quite convincingly that a child who is not skilled in standard English when he enters school may suffer on two counts:

1. His native language or dialect may hinder his acquisition of standard English because of structural and phonological differences.
2. The act of trying to change his language immediately upon entering school may create motivational difficulties for him (Williams, 1970). Proponents of this view argue that a child first needs to be taught basic skills in his own language or dialect and then at a later age, when he can understand the reasons for so doing, transferred to standard English. Such an approach is currently being tried out with a number of different language groups.[24] However, these efforts are relatively new and their efficacy has not yet been determined.

We have described just a few of the kinds of consideration that have emerged in our thinking about approaches the schools might employ to enhance student motivation. But, we may ask: What should the nature of future research be on factors that contribute to Attitude Toward Life? We can envisage two possible approaches that might well be pursued simultaneously, thereby enhancing each other. The first would involve collecting comprehensive data on the same children over a number of different time periods. Such a study would employ more detailed data on parent-child and child-peer interactions, as well as more detailed data on school programs and practices. In this way we would hope to gain a clearer understanding of how the variables studied here interact over time. The second approach would involve manipulating a number of different conditions in an experimental framework in order to ascertain their affects on a student's outlook on life. For example, peer-group variables, school incentives, and the nature of parent-child interactions might be experimented with, alone and in different combinations. Another problem that urgently needs study is the effect upon a black child from a predominantly black school of being placed in, or transferred to, a majority-white school.

In summary, although little is known about what improves one's outlook on life, a number of changes that might play an ameliorative role can be suggested. These range from the elimination of discriminatory practices in housing and employment and the provision of adequate employment (or other means of sustenance) to greater involvement of parents and children in what we have termed educationally related child-rearing activities. We also believe that alteration of the schools' reward structure and performance criteria will be necessary if equality of educational opportunity is to be achieved for all students, regardless of their background.

[24] These activities are sponsored by title VII of the Elementary and Secondary Education Act of 1965.

Appendix: The Data-Analysis Model[1]

The following logical steps were incorporated into our computer program.

Item Analyses.—Each questionnaire item was analyzed against one or more variables of interest. In this way we were able to use not only the percentage of respondents choosing each item but also their average on the variables of interest as a guide in assigning scale values. We did the same with the nonrespondents. For the student questionnaire, item responses were analyzed against an achievement composite.[2] For the teacher questionnaire, item responses were analyzed against the number of items that were answered correctly on the teacher's vocabulary test.[3] Questionnaire responses to the school principal questionnaire were analyzed against the principal's response to questions concerned with his annual salary, number of students enrolled in his school, the rural, suburban, or urban location of the school, and the proportion of children in the school from working-class families.[4]

Coding and Intercorrelation of Variables.—An approximately 10-percent sample of students was drawn from the student master tapes at each grade level. The variables were then coded and intercorrelated.[5] For the teachers and principals a breakdown into elementary and secondary was made, and correlations were computed for each breakdown. The full numbers of teachers and principals included in the survey were used in these analyses.

Reduction of Variables to Indices.—The intercorrelation matrices for the above steps were subjected to a series of factor analyses in order to obtain meaningful groupings of the variables, called indices.[6]

Computation of Index Scores.—The weights obtained from the factor analyses were used to compute index scores first, by standardizing each variable to a mean of zero and a standard deviation of 1; then, by multiplying each variable by its respective weight; and finally, by summing these values. Index scores were computed for all the students included in the survey, together with index means, standard deviations, and intercorrelations.[7]

Computation of School Averages.—The mean score for each school was computed for both students and teachers on the indices and variables that were carried along separately.

Merging of School Data.—The school means for students and teachers were merged with the school data for principals on a single tape (one tape for each of the five grade levels).

Computation of Correlations and Regressions.—We performed a large number of statistical analyses in order to establish the variables' relationships with each other. The primary statistical tools used were regression analysis and partition of multiple correlation.

A.1. THE DATA-ANALYSIS MODEL AND ITS PROPERTIES

The data for this study were obtained by appending to each student the attributes of his school appropriate for his grade level, as they were developed in the School Study. This procedure generates a data matrix that can be compared with the following hypothetical one:

		1	2	3	4	5
		SES	ATTUD	$\overline{SES}$	$\overline{ATTUD}$	PTR
	1	SES_{1A}	$ATTUD_{1A}$	$\overline{SES}_A$	$\overline{ATTUD}_A$	PTR_A
	2	SES_{2B}	$ATTUD_{2B}$	$\overline{SES}_B$	$\overline{ATTUD}_B$	PTR_B
STUDENTS	3	SES_{3C}	$ATTUD_{3C}$	$\overline{SES}_C$	$\overline{ATTUD}_C$	PTR_C
	4	.	.	.	.	.
	.	.	.	.	.	.
	.	.	.	.	.	.
	.	.	.	.	.	.
	.	.	.	.	.	.
	N	.	.	.	.	.

In this matrix the individual student, as represented by the numbered rows from 1 to N, is the basic unit of observation. The five columns of the matrix represent different kinds of variables. The first two columns contain observations on each student's Socio-Economic Status (SES) and Attitude Toward Life (ATTUD), respectively. The third and fourth columns contain the average Socio-Economic Status ($\overline{SES}$) and average Attitude Toward Life ($\overline{ATTUD}$) of students in the same school and grade level as the individual student. The last column contains a more traditional school variable, the Pupil-Teacher Ratio (PTR) for students of the same school and grade level. The alphabetical subscripts (A, B, C, etc.) are used to designate the schools.

When these variables are intercorrelated the values for each individual student enter into the computational formula. They

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[1] A slightly different version of this appendix has already been published as appendix A in *A Study of the Achievement of Our Nation's Students* (Mayeske et al., 1972b). The information has been repeated here, *mutatis mutandis*, because each study is designed to stand by itself.

[2] Mayeske et al., 1968b.

[3] Mayeske et al., 1967.

[4] The codes used for these analyses, as well as the means, standard deviations, and intercorrelations for the students, teachers, and principals, are given in the appendixes of the School Study (Mayeske et al., 1969). The student items were coded by means of criterion scaling.

[5] Mayeske et al., 1968a.

[6] Principal components analyses were used, with varimax rotations of components having a root of 1 or more.

[7] The items and weights used in forming these indices are given in the Technical Supplement, available from the senior author at the U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

result in the following hypothetical correlation matrix:

STUDENT CORRELATIONS

	1 SES	2 ATTUD	3 $\overline{\text{SES}}$	4 $\overline{\text{ATTUD}}$	5 PTR	
1. SES	1.00	r_{12}	r_{13}	r_{14}	r_{15}	STUDENT–SCHOOL CORRELATIONS
2. ATTUD	r_{12}	1.00	r_{23}	r_{24}	r_{25}	
3. $\overline{\text{SES}}$	r_{13}	r_{23}	1.00	r_{34}	r_{35}	SCHOOL CORRELATIONS
4. $\overline{\text{ATTUD}}$	r_{14}	r_{24}	r_{34}	1.00	r_{45}	
5. PTR	r_{24}	r_{25}	r_{35}	r_{45}	1.00	

Since this matrix is symmetric, the values below the main diagonal (upper left to lower right) will be the same as those above the diagonal. The dotted line is used to separate the submatrix of student correlations from school correlations. Using this matrix, and assuming that we are interested in the regression of ATTUD on SES, we can conduct the following analyses:

TOTAL: The effectiveness of the regression of individual student ATTUD on SES is measured by r_{12}^2. For more than one variable it would be measured by the squared multiple correlation obtained by regressing individual ATTUD on several other individual student variables. School variables can be brought into this analysis as well. For example, PTR can be brought into the analysis with SES and ATTUD to give the multiple regression of ATTUD on PTR and SES.

AMONG: The effectiveness of the regression of school $\overline{\text{ATTUD}}$ on school $\overline{\text{SES}}$ is measured by r_{34}^2. For more than one variable it would be measured by the squared multiple correlation obtained by regressing school $\overline{\text{ATTUD}}$ on several other school variables. For reasons given below, individual student variables are not brought into this kind of analysis.

WITHIN: A within-school regression is conducted by partialing $\overline{\text{ATTUD}}$ out of ATTUD by means of partial correlation techniques, and then regressing ATTUD on SES (i.e., through observation of the squared partial correlation that remains). This operation renders the residuals of ATTUD uncorrelated with or independent of $\overline{\text{ATTUD}}$, and consequently uncorrelated with any other school variables that are correlated with $\overline{\text{ATTUD}}$.[8]

$\overline{\text{ATTUD}}$ is the one school variable that is most similar to or highly correlated with ATTUD. The squared correlation of $\overline{\text{ATTUD}}$ with ATTUD represents the maximum amount of variance in ATTUD that can be explained by analyzing differences among schools. Consequently, when ATTUD is partialed out of ATTUD all the remaining school variables are uncorrelated with ATTUD. In general, when an individual student variable is correlated with its school-mean counterpart, that correlation is the maximum value that can be obtained by correlating it with any other variable or combination of variables. When the school-mean counterpart is partialed out of an individual student variable, all of the differences in that variable associated with differences among schools are removed. This is also one of the reasons why an individual student variable is not entered into an "among" analysis: the maximum differences among schools on that variable are just as well represented by the variable's school-mean counterpart.

[8] An algebraic proof of this assertion is given in the Technical Supplement.

A.1.1. The Commonality Model and Its Properties

Extensive use was made in this study of a technique called commonality analysis. This technique partitions the variance in a dependent variable that is predictable from two or more sets of regressor variables into the proportion that can be uniquely associated with each set, and the proportion that is in common with two or more of the sets. The following discussion will focus on the development of the model for two and three sets of variables, and then go on to a discussion of the meaning of these results. A mathematical development of the model is given in the Technical Supplement.

Let us assume that we have two sets of variables, B and S. In the context of the ensuing chapters, B might represent different measures of the student's family background, S might represent different measures of the school he attends, and A might represent his attitude toward life. Suppose now that we run a regression and obtain a squared multiple correlation for A against each set of variables, alone and in combination. For two sets of variables we will have three squared multiple correlations: $R^2(B)$; $R^2(S)$; and $R^2(B,S)$, where the letter or letters in parentheses represent the set or sets entered into the regression. Then the proportion of the squared multiple correlation that can be uniquely associated with the B and S sets, designated U(B) and U(S), is given by:

$$U(B) = R^2(B,S) - R^2(S) \quad (1)$$

$$U(S) = R^2(B,S) - R^2(B) \quad (2)$$

These unique values are sometimes referred to as first-order commonality coefficients. The proportion of predictable variance that is common to the two sets of variables, called the

second-order commonality coefficient, is given by:

$$C(B,S) = R^2(B,S) - U(B) - U(S) \quad (3)$$

This partitioning results in the following additive properties:

$$R^2(B) = C(B,S) + U(B) \quad (4)$$

$$R^2(S) = C(B,S) + U(S) \quad (5)$$

That is, the squared multiple correlations for B and S can be expressed as a function of their different orders of commonality coefficients; viz, the common portion plus the unique portion. In the context of our study this kind of analysis indicates the extent to which the predictable variance is shared in common by the two sets, and the extent to which it can be associated with either of them.

The results of these analyses are organized somewhat as follows:

Order of Commonality Coefficients		B 1	S 2
First	U(Xi)	a	b
Second	C(X1X2)	c	c
	R-SQUARE(Xi)	d	e
	R-SQ(X1, X2)	f	f

In this table the first-order commonality coefficient, or portion uniquely attributable to each set, is given in the U(Xi) row. Here, Xi stands for the set contained in each column, represented by B and S, respectively. The second-order commonality coefficient is the same for each column, as is the R-SQ(X1,X2). The squared multiple correlation for each set, B or S, is given in the row R-SQ(Xi). Also, the following empirical values in this table would be additive: a+c=d, b+c=e, and a+b+c=f. When we perform a unitizing operation on these results, the different order-of-commonality coefficients sum to 100. This operation is performed by dividing each of the empirical values in this table by the value for *f*. Usually only the unitized values for U(Xi) and C(X1X2) are presented.

For the three-set case let us designate the third set as 0, for "other." From entering all the different combinations of sets in the regression we obtain the following squared multiple correlations: $R^2(B)$; $R^2(S)$; $R^2(O)$; $R^2(B,S)$; $R^2(B,O)$; $R^2(SO)$; and $R^2(B,S,O)$. Then the first-order commonality coefficients are given by:

$$U(B) = R^2(B,S,O) - R^2(S,O) \quad (6)$$

$$U(S) = R^2(B,S,O) - R^2(B,O) \quad (7)$$

$$U(O) = R^2(B,S,O) - R^2(B,S) \quad (8)$$

The second-order commonality coefficients are given by:

$$C(B,S) = R^2(B,S,O) - R^2(O) - U(B) - U(S) \quad (9)$$

$$C(B,O) = R^2(B,S,O) - R^2(S) - U(B) - U(O) \quad (10)$$

$$C(SO) = R^2(B,S,O) - R^2(B) - U(S) - U(O) \quad (11)$$

Finally, the third-order commonality coefficient, of which there is only one, is given by:

$$C(B,S,O) = R^2(B,S,O) - C(B,S) - C(B,O) - C(S,O) - U(B) - U(S) - U(O) \quad (12)$$

The squared multiple correlation for any single set can then be expressed as a function of its different order-of-commonality coefficients. For example, the squared multiple correlation for the "other" set, $R^2(O)$, can be expressed as:

$$R^2(O) = C(B,S,O) + C(B,O) + C(S,O) + U(O) \quad (13)$$

Results of three-set commonality analyses are organized somewhat as follows:

Order-of-Commonality Coefficients		B 1	S 2	O 3
First	U(Xi)	a	b	c
Second	C(X1X2)	d	d	
	C(X1X3)	e		e
	C(X2X3)		f	f
Third	C(X1X2X3)	g	g	g
	R-SQ	h	i	j
	R-SQ(X1X2X3)	k	k	k

With three sets, there are now three second-order commonality coefficients. The additive properties are: a+d+e+g=h; b+d+f+g=i; c+e+f+g=j; and a+b+c+d+e+f+g=k. When these coefficients are divided by R-SQ(X1X2X3), which in the table has the empirical value of *k*, they are called "unitized" coefficients. Usually, the only coefficients given in the preceding chapters are of this kind.

On occasion a second kind of unitized commonality analysis is performed. This involves dividing the commonality coefficients for a set of variables by the variation in the dependent variable associated with that set. For example, by dividing both sides of equation 13 by its left-most member we obtain an equation that is unitized in terms of $R^2(O)$ as follows:

$$1.00 = \frac{C(B,SO)}{R^2(O)} + \frac{C(B,O)}{R^2(O)} + \frac{C(S,O)}{R^2(O)} + \frac{U(O)}{R^2(O)} \quad (14)$$

This is equivalent to dividing column 3 in the preceding table by *j*. Performing this "unitizing" operation enables us to compare, across diverse groups, the extent to which the variation in a dependent variable associated with a single set of variables is confounded with other sets. Focusing on only one set reduces the number of comparisons to be made—a task that, with several sets in the analysis, might otherwise be unwieldy. Of course, the investigator has to decide that one set is of greater interest to him than the others.

A number of terms have been used interchangeably to refer to the first-order and higher order commonality coefficients. The first-order coefficient is often called the *unique role*, *unique value*, *unique portion*, or *independent role*. Similarly, the higher order coefficients (those other than the first-order ones) are often referred to as the *common role*, *common portion*, *common value*, or *shared role*.

One might ask what meaning can be attributed to these different coefficients. The first-order coefficients (the unique portions, U(Xi)) represent that portion of the predictable variation that can be uniquely associated with one of the sets. In the strictest sense, the higher order coefficients (those other than U(Xi)) represent our inability to separate out the functioning of one set from the other.

As for the possible influences that the different sets of variables exert on the dependent variable, it would seem that both the unique and the common portions could represent such in-

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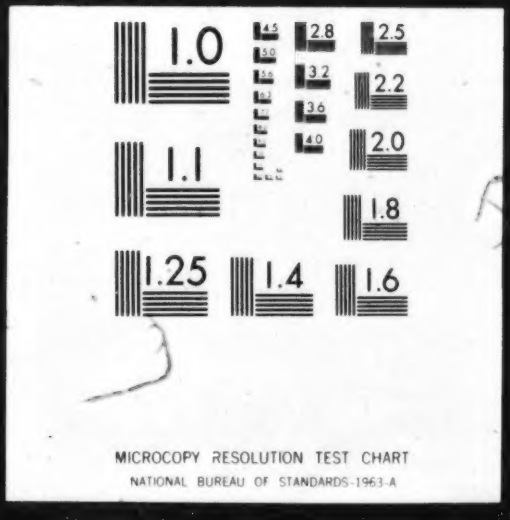

fluences. The common portions might represent the joint influence of two or more sets, or they might represent the fact that the occurrence of one attribute is accompanied by the occurrence of a second attribute. For example, students from the lower socioeconomic strata are more likely to have a less intact family structure, to be less well-motivated and have lower achievement, and so forth. This line of reasoning is further reinforced by the fact that the unique portion for a set of variables, which is usually considered as representing a causal influence, can be moved up to the higher order when a new set of variables is entered into the analysis with it. This occurs for example, when motivational variables are entered into the analysis with Socio-Economic Status and Family Structure.

A.2. AN HYPOTHESIS TESTING FRAMEWORK FOR STRATIFIED REGRESSIONS

Much of this report is devoted to the systematic study of how the relationships of family background, achievement, and school factors with attitude toward life differ for different subgroups of students. For example, differences among these relationships are explored for students in different areas of the country, for students of different racial-ethnic group membership, and for boys and girls. The following framework, described in detail in the Technical Supplement, was used to test systematically for the extent of these subgroup differences.[1] A sequential procedure, which utilizes various sums of squares and mean squares from a covariance analysis, was run as follows:

H_1 Are the cell (or subgroup) regressions, including the cell intercepts and slopes, similar to the overall regression obtained when all students are combined without regard to subgroup membership? If this hypothesis is accepted, then the sequence is terminated. However, if this hypothesis is rejected, then the next hypothesis in the sequence is tested.

H_2 Are the cell slopes (or regression weights), excluding the cell intercepts, similar to the overall slope obtained when all students are combined without regard to subgroup membership? If this hypothesis is rejected, then the sequence is terminated. However, if the hypothesis is accepted, then two more tests are available for distinguishing between different kinds of intercepts. Since only the first two hypotheses are of interest in this study, the others are not discussed (although they are presented in the Technical Supplement). The F statistic is used to determine whether to accept or reject the hypothesis.

If, by means of this hypothesis testing framework, the subgroups are found to be different, then comparative commonality analyses are usually run to determine how the sets' relative roles may change from one group to another.

[1] The technique used is one outlined by Kuh and programed by A. E. Beaton, Jr. (1964). It is similar to the one presented by J. Wilson and L. Carry (1969).

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